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ANALYSIS OF THE ROOT OF STILLINGIA SYLVATICA, LIN.

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Abstract from a Thesis.

Moisture.—Two grams of powdered stillingia root were placed in a weighed porcelain crucible, and dried in a current of air at 110°C. until it ceased to lose weight. Loss, 0·31 Gm., or 15·5 per cent.

Ash.—5 Gm. of the drug were ignited at a low red heat, in a suitable vessel, until all carbon was consumed, yielding 0·25 Gm. of ash, equivalent to 5 per cent., of which 0·051 was soluble in water, 0·101 in hydrochloric acid, 0·027 in sodium hydrate, and 0·071 was insoluble.

Benzol Extract.—20 Gm. of the drug, in No. 80 powder, were moistened, placed in a percolator, and completely exhausted with benzol. The combined percolate measured 150 cc., and yielded 1·0 Gm. of extract, equivalent to 5 per cent. The extract was soft, of a reddish yellow color, and consisted of resin, fixed oil, volatile oil, and coloring matter. Water dissolved 0·15 Gm. of the extract, alcohol 0·55 Gm. (also soluble in ether and carbon disulphide), and 0·3 Gm. was insoluble in water and alcohol. The solution of the extract in water, tested for alkaloids by phosphomolybdic acid, platinic chloride and other reagents gave negative results; and when boiled with HCl, neutralized with KHO, gave negative results with Fehling's solution as a test for glucosides.

Alcohol Extract.—The stillingia treated with benzol was dried at a moderate heat and exhausted with 80 per cent. alcohol; the combined percolate measured 350 cc., and yielded 4·396 Gm. of extract, equivalent to 21·98 per cent. The extract was treated with water, and the tannin estimated with a freshly prepared solution of gelatin and alum. The precipitate weighed 5·16 Gm.; estimating 45 per cent. of this as tannin, a net result of 11·61 per cent. is shown. This tannin pro-

duced a green color with iron salts, and white precipitates with solutions of tartar emetic and morphine.

The filtrate recovered from the tannin estimate was acidulated with H_2SO_4, mixed with an equal volume of alcohol, filtered, evaporated free of all alcohol, and the acid solution tested for alkaloids and glucosides, with results showing the latter to be absent. With phosphomolybdic acid, solution of platinic chloride and Mayer's solution precipitates were obtained. The remaining acid solution was then carefully neutralized with ammonia, and the resulting precipitate treated with 95 per cent. alcohol, which upon evaporation yielded an amorphous powder. After several unsuccessful trials to obtain an additional amount of the alkaloid the following plan was devised: The powdered drug was mixed with one-third of its weight of slaked lime and dried; the mixture was treated with alcohol until exhausted; dilute sulphuric acid was added, the liquid filtered, evaporated free from alcohol, and on neutralizing the acid solution the alkaloid was obtained. When heated it was entirely volatilized; treated with KHO, ammonia evolved; with H_2SO_4 it combines to form a sulphate, which was obtained in fine scale-like crystals. For this alkaloid I propose the name of *Stillingine.*

Cold Water Extract.—The drug, after the alcohol treatment, was macerated and percolated with cold water until exhausted; the percolate was of a straw-yellow color, yielded an extract weighing 0·55 Gm., or 2·75 per cent. It was found to be principally gum. Strong alcohol and solution of subacetate of lead produced copious precipitates.

Acid Extract.—After drying the residue of the foregoing operation it was found to weigh 10·648 Gm. It was mixed with 400 cc. of water and 10 cc. of H_2SO_4, boiled continually for eight hours, water being occasionally added to preserve the quantity. The liquid now contained all the starch of the root as glucose; it was thrown upon a filter, and thoroughly washed with warm water until the filtrate measured 800 cc. Fehling's solution showed the presence of 4·3243 Gm. of glucose, which was formed from 3·89187 Gm. of starch. The weight of the insoluble portion after drying was 5·902 Gm.; total acid extract, therefore, 4·746 Gm., and of acid extract, not starch, 0·86413 Gm., making the total acid extract 23·73 per cent.

Alkali Extract.—The above remainder was boiled for 3 hours in 200 cc. of a 10 per cent. solution of NaOH, filtered, and washed with water to remove all alkali; the residue after drying weighed 4·592

Gm., making the alkali extract 1·31 Gm. The insoluble residue consisted of crude fibre and ash; to obtain pure cellulose it was macerated for 24 hours in a solution of chlorinated soda, washed, dried, and now weighed 4·367 Gm. This contained 0·355 Gm. of ash, leaving for pure cellulose 4·012 Gm., or 20·06 per cent.

Volatile Principles.—100 Gm. of the finely powdered drug were placed in a retort, macerated for 48 hours with water and distilled; the distillate was neutral, of a straw-yellow color, and possessed a very strong, disagreeable odor. On the surface of this distillate oil was found weighing 3·25 Gm., equivalent to 3·25 per cent. The distillate was tested for alkaloids by the usual tests with negative results.

On summing up the result of the different operations the following is produced:

	Per cent.
Moisture	15·50
Ash	5·00
Benzol extract (resin, fixed and volatile oil, coloring matter)	5 00
Alcoholic extract (tannin, alkaloid, resin)	21·98
Aqueous " (gum)	2·75
Acid " (starch)	23·73
Alkali " (coloring matter)	6·55
Cellulose	20·06
Total	100·57

A SIMPLE METHOD OF ASSAYING CRUDE IPECAC.[1]

By A. B. Lyons, M.D., Detroit, Mich.

Complaint is frequently made of preparations of ipecac that they are deficient in strength. It not infrequently happens that a preparation of the drug is employed under circumstances which render it a matter of the utmost importance that it shall produce promptly its peculiar physiological effect. Failure may mean indeed death of the patient to whom the dose has been administered. It is obvious, therefore, that a ready means of ascertaining the quality of preparations of this drug ought to be in the hands of every pharmacist, and that it should be so simple that there could be no excuse offered for remaining in ignorance in regard to the character of preparations to be dispensed. The query I have accepted appears to have been prompted by some

[1] Read before the Michigan Pharmaceutical Association.

such considerations as these, and although in its letter it applies only to the crude drug, it is fair to assume that its spirit may cover an inquiry into the method of assaying the galenical preparations of ipecac.

Crude ipecac may be assayed in various ways according to the object proposed in the investigation. We may desire to know simply what is the medicinal activity of the root in its crude state, either expecting to employ it in the form of a powder to be given in substance, or desiring to know how to adjust the doses of the various preparations of the drug. Or we may wish to ascertain how much alkaloid we can extract from the root by a given process; our assay process in such a case would not seek to exhaust the drug, but rather to imitate on a small scale the extraction process adopted in the actual manufacture.

Before entering upon a study of these several assay processes, it may be advantageous to review the methods that have been proposed for extracting emetine from the drug.

The process of MM. Pelletier and Dumas ("Ann. Ch. Phys. [2] xxiv, 180") is that given in most of the text books. It is given in Watts' Dictionary of Chemistry as follows: "The powder of ipecacuanha is digested in water with calcined magnesia; the deposit is thrown on a filter, washed carefully with very cold water and dried, and the emetine is then taken up by alcohol. It may then be combined with an acid, and the salt may be purified with animal charcoal." The yield is not stated. The method is one I have never tried, partly because I hesitated about exposing the alkaloid to the action of magnesia during the drying process, and partly because experience with other alkaloids does not favor the use of an aqueous menstruum in the primary extraction.

A process quite similar to this one in principle was recommended in 1875 by Glenard ("Journ. de Pharm. et Chim. Sept. 1875"), but ether is employed as the solvent in place of alcohol—an obvious improvement, and lime is substituted for the magnesia. The process "consists in treating with ether a suitably prepared powder, or an extract of ipecacuanha and lime, or the precipitate formed upon adding an excess of lime to a solution obtained by treating ipecacuanha in the cold with water acidulated with sulphuric acid. Either of these mixtures, or the precipitate when treated with ether will yield all the alkaloid it contains." The alkaloid is removed from the ethereal solution by shaking with acidulated water, and may then be precipitated by the addition of ammonia. From this precipitate crystallizable salts may

be readily prepared, although these salts require careful manipulation to obtain them in the crystalline form. Glenard observes that ammonia does not precipitate from solutions containing an excess of (hydrochloric) acid all of the alkaloid, a portion being retained in the solution, probably in the form of a double salt of emetine and ammonia.

In 1877 MM. Lefort and Würtz published ("Journal de Pharmacie") a process involving the same general principles, but taking advantage, in the first stage of the operation, of the sparing solubility of the nitrate. "An alcoholic extract of ipecacuanha is dissolved in about its own weight of water. A cold saturated solution of potassium nitrate is added, until a precipitate ceases to fall, and the mixture is set aside 24 hours. The abundant pitchy, blackish brown deposit is washed three or four times with a small quantity of water, dissolved in a little hot alcohol, and thrown into a thick milk of lime, containing about its own weight of calcium hydrate. The mixture is evaporated to dryness on a water-bath, the mass powdered and extracted by maceration with ether."

Podwissotzky in 1880 ("Pharm. Zeitschr. für Russl.") published an improved method for preparing pure emetine, and described anew the properties of the alkaloid. His process depends on the solubility of emetine in hot petroleum benzin. He recommends to treat the powdered drug with ether, then with petroleum benzin, to remove fatty and waxy matter, to exhaust the powder with 85 per cent. alcohol employing a moderate heat, but without addition of acid, to evaporate the extract to the consistence of a syrup, and when cold add ferric chloride (10 to 13 per cent. of the weight of the drug) in concentrated aqueous solution; then having added an excess of sodium carbonate, to boil the mixture with several successive portions of petroleum benzin as long as alkaloid is taken up. The solution when cold deposits the alkaloid in white flakes, and the product is very pure. An alternative process is given which is much simpler. The powdered ipecacuanha is triturated to a thick paste with a little hydrochloric acid, ferric chloride added as before, then sodium carbonate, and the mixture is allowed to stand some time. It is then extracted with successive portions of ether, the alkaloid removed from the ethereal solution by acidulated water. Soda is then added in excess, and the alkaloid removed by boiling petroleum benzin, as in the first process. The author states that the best kinds of ipecacuanha yield from three-quarters to one per cent. of emetine; inferior kinds only one-quarter to one-half of one per cent.

It has seemed to the writer that this last process, which is the best yet proposed, can be still further simplified and improved, and experiments appear to warrant the recommendation of a process like the following: Mix 10 parts of the powdered ipecacuanha in a flask, or other suitable container, with an equal weight of petroleum benzin. Add a mixture of two parts of stronger water of ammonia with eight parts of alcohol; shake the mixture well and allow it to stand a short time in a warm place. [In my experiments I allowed the mixture to stand from half an hour to one hour, but I am not sure that there is any advantage in leaving it so long a time even as this.] Proceed to extract the alkaloid by boiling with successive portions of petroleum benzin, amounting in all to ten or fifteen times the weight of the drug. Filter the benzin solution while hot through paper, and treat it with water containing sulphuric acid, which readily removes the whole of the alkaloid, leaving resinous matter in the benzin. Separate the acid solution, filter if necessary to remove suspended matter, add excess of alkali (carbonate of barium, carbonate of sodium, or ammonia) and take up the alkaloid with boiling petroleum benzin, as recommended by Podwissotzky. I believe that by this method it is practicable to extract from ipecacuanha of good quality not less than two per cent. of alkaloid. The solvent used, although employed in large quantity, is a very cheap one, and the loss in manufacturing operations would be a trifling item of expense, as compared with that involved in the use of the more expensive solvents, such as alcohol, ether or chloroform.

The process, moreover, is one which can easily be employed as an assay process, which is not true of any of those previously passed in review. Its advantages for this purpose are its simplicity of execution, and the rapidity with which it can be carried out. It does not completely exhaust the drug, although it permits us to extract a larger proportion of the alkaloid than any other rapid method I have tried. By using a portion of chloroform in connection with the benzin, the process may be made to yield results, as we shall see later, reasonably satisfactory. Obviously, in any case, if our object is to ascertain, not the absolute, but the practical value for the manufacturer of a given sample of ipecac, we should be justified in making use of even an imperfect method of assay, the results of which would indicate the quantity of alkaloid we might hope to obtain from the drug.

Of the methods that have heretofore been proposed for the assay of

ipecacuanha, that of Zinoffsky, recommended by Dragendorff (Werthbestimmung einiger starkwirkender Droguen) is the only one worthy of consideration. Dragendorff directs to mix the finely powdered drug with five times its weight of water containing sulphuric acid [one minim of a dilute acid 1:8, for each grain of drug], allow to macerate twenty-four hours, add alcohol, equal in weight to the water used, and continue the digestion 48 hours. An aliquot portion of the fluid is then to be evaporated to drive off the spirit, and the residue diluted with water, filtered and titrated with Mayer's reagent, of which 1 cc. precipitates 0·0189 gm. emetine.

The process is very easy of execution, and has in its favor the circumstance that it shows a larger proportion of alkaloid than any other assay process.

The time of the assay may be somewhat shortened, if the drug is employed in a very fine powder, by allowing the maceration to go on at a temperature of 50°C. (122°F.) and shaking the mixture frequently. It is not, however, easy to reduce the root to an impalpable powder, and it is better, when there is no haste, to extend the time of maceration to three or four days. The details of the process, as I am in the habit of using it, are as follows:

Place in a suitable bottle or flask 50 cc. of distilled water (without addition of acid), afterwards put in ten grams of ipecacuanha in fine powder; mix, cork the bottle or flask, and set by in a warm place, shaking occasionally. At the end of twenty-four hours add to the mixture 52 cc. of alcohol, making a total of 100 cc. of menstruum owing to condensation of volume; cork, and set aside again for three days, shaking well several times a day. Then measure out with a pipette for the assay 25 cc. of the clear fluid, which will represent as nearly as possible 2½ grams of drug. Put this in a capsule, add 5 drops of a highly dilute sulphuric acid (containing 6 per cent. H_2SO_4), evaporate at a gentle heat until all the alcohol is driven off, add water to make up to the original measure of 25 cc., digest a few minutes on the water bath, allow the mixture to cool, and proceed, without filtering, to titrate with Mayer's reagent. [Filtration appears to involve a needless expenditure of time, observation showing that it does not affect the result.]

The solution employed for the titration may conveniently be made of one-half the strength of Mayer's reagent. One litre will contain therefore 6·773 grams corrosive sublimate and 25· grams potassium

iodide. Add of this reagent two or three cc. at first, and filter. As soon as a sufficient quantity of clear filtrate has run through (5 to 10 cc.) add to this a few drops of the reagent, and if a copious precipitate is produced, add about 1 cc. and immediately return the mixture to the filter. The first portion of filtrate (10–15 cc.) that passes after this has been done must be returned also, but the succeeding portion is to be tested again with Mayer's reagent. As soon as the precipitation ceases to be copious, the reagent is to be added only 0·1 cc. at a time, and nearly the whole of the fluid allowed to pass through the filter before testing again. Filtration is generally rapid, so that the entire operation consumes but a short time, and it is easy to carry on several titrations at once, where a series of assays are to be made. The time actually occupied in such an assay is scarcely more than half an hour, and the manipulations require no especial skill. The result is easily calculated, by merely multiplying the number of cc. of reagent consumed by 0·378, the product expressing the percentage of emetin in the drug. It is customary to calculate the result upon the dry drug, but for commercial purposes there is no advantage in doing this. It is easy, however, to obtain the corrected figure, if at the same time that the powder is weighed for the assay, a second portion of one gram is also weighed for estimation of moisture. This is to be dried at a temperature not exceeding 105°C. (221°F.), as long as it continues to lose weight. In this way, it will be found that the powder generally contains 5 to 8 per cent. of moisture.

Suppose the drug to have contained 6·5 per cent. moisture, and to have indicated in the assay 2·4 per cent. emetine. The corrected per cent. will be found by solving the proportion 100—6·5 : 100 : : 2·4 : x, and will be, therefore, 2·4 ÷ ·935 = 2·57 per cent.

To what extent, however, can we put confidence in these results? We find, in most cases, that results obtained by titration with Mayer's reagent vary very greatly according to the dilution of the fluid. It is therefore necessary, in order to obtain results of any value, to be careful that the proportion of alkaloid contained in the solution shall not vary materially from a fixed standard, and it is equally necessary to employ always in the assay the same proportion of free acid. It is, indeed, often necessary to make two titrations, the first merely to ascertain approximately the amount of alkaloid present in order to determine what should be the volume of the fluid to be titrated, and a third experiment even may become necessary. Emetine is, however,

an exception to the majority of alkaloids in this regard. While dilution of the fluid is not without influence on the result, this influence may be disregarded if the proportion of alkaloid in the fluid lies between 1:250 and 1:500, and such is almost invariably the case if the directions above given be followed.

The examination of the various galenical preparations of ipecac can also be readily made by Mayer's reagent. Solid extracts are to be exhausted with acidulated water, or, in case they contain much resinous matter, with acidulated alcohol, water being afterwards added and the spirit evaporated off; the aqueous fluid is to be then titrated as usual. The fluid extract presents no difficulty whatever. Dilute a portion of the fluid with water to exactly four times its original volume, and take 10 cc. of the mixture for the assay. Add 5 minims of the 6 per cent. sulphuric acid, evaporate on the water bath to drive off alcohol, make up to a volume of 15 cc., and titrate.

A more important question, however, arises, viz., does the drug contain nothing besides emetine capable of giving a precipitate with Mayer's reagent? The results of assay by the method of Dragendorff indicate the presence in ipecac root of from 2 to 3·9 per cent. of emetine. Those who have attempted to extract the alkaloid have generally reported a yield of less than one per cent., but this, as I have already intimated, is due in part, at least, to defective methods of extraction. Dragendorff, himself, admits that he was not able to extract, by means of chloroform, the entire amount of emetine shown to be present by titration with Mayer's reagent. This he attributes to loss of alkaloid through the action of the alkali employed to set it free, although in some of his experiments he used for this purpose barium carbonate, and it seems hardly possible that this should exert such an influence. By the use of Mayer's reagent he found in the drug about 3·75 per cent. of alkaloid. He was able, however, to extract by chloroform only 2·4 to 2·9 per cent., but he does not say distinctly that the same drug was employed in both cases. Others have had a similar experience. One observer only has reported identical results by the two processes, and he states that he took the precaution in the extraction with chloroform to exclude air from the flask. My own results, in a series of experiments with one sample of ipecac, seem to me to confirm Dragendorff's view, but in experimenting with another sample of the drug the discrepancy in results seemed to me greater than could possibly be accounted for by changes taking place in the alkaloid during

the very short process of extraction. That the alkaloid is an extremely sensitive one, no one who has experimented with it at all can doubt. Even after it has been isolated, it must be kept in the dark to prevent changes that would otherwise take place in it.

Incidentally, I may ask, in view of this sensitiveness of the alkaloid, what shall we think of the present U. S. P. process for making fluid extract of ipecac, with its complicated manipulation and long exposure of the product to heat.

There is no difficulty in preparing a fluid extract of ipecac with alcohol of moderate strength that will contain, by Dragendorff's mode of assay, upwards of 2 per cent. of emetine. By the U. S. P. process, a drug which assays 3 per cent. alkaloid will produce a fluid containing less than 1·5 per cent. From the first mentioned extract, similar to that which was formerly official, it is easy enough to prepare a syrup, although certainly this cannot be done by simply mixing the fluid extract with syrup; to my own mind the admission of the present formula into the U. S. P. is an unwarranted concession to slipshod pharmacy, against which we should all unite in protest.

Returning from this digression, I attack the main problem of this "query," seeking some simple method of actual assay by which the whole of the emetine may be extracted from the drug in a weighable form.

An exhaustive study of this problem would require much more time than I have been able to give it. I have made many experiments, a large number of them having no value except as indicating plans to be avoided in future. The principle to be adopted in every case in the assay of a drug of this kind, is to select such a menstruum for the exhaustion of the drug as shall extract as completely as possible its active principle and withdraw with it a minimum of inert matter. The solvent which I have found most generally useful in these assays is that employed by Prollius for extracting the alkaloids of cinchona bark. It consists of a mixture of ether 250 parts, absolute alcohol 20 parts, ammonia, stronger, 10 parts. The general mode of carrying out the assay I have elsewhere described in detail ("Druggist's Circular," August, 1884). As applied to the assay of ipecac it would be conducted as follows:

Place in a small flask (capacity about 50 cc.) 2½ grams, accurately weighed, of ipecac in fine powder; select a sound cork to fit the flask, and weigh flask and cork with the contained ipecac. Fill the flask

nearly full with the mixture of ether, ammonia, and alcohol, and set aside, shaking occasionally, for twenty-four hours. Weigh the flask with its contents before removing the cork; decant as much of the clear fluid as practicable, taking care to operate rapidly to avoid evaporation. Immediately cork the flask again and weigh. You may now separate the alkaloid from the decanted portion of ether by shaking repeatedly with acid water, and again washing out from the aqueous solution, rendered alkaline, with chloroform, but identical results can be obtained more rapidly by merely evaporating the ether after addition of water containing 10 minims of 6 per cent. sulphuric acid, and titrating the aqueous solution (made up to 20 cc.) with Mayer's reagent.

The calculation of the assay is not difficult. You have as data total weight of solvent used, weight of portion of solvent with contained alkaloid, resins, etc. You may assume that the solvent has taken up in all 5 per cent. of material from the ipecac. This will amount to $2{\cdot}5 \times {\cdot}05 = 0{\cdot}125$, to be added to the weight of the total solvent—a quantity so trifling that it may be neglected in practice—since this assay is not close enough to render important minute fractions.

Suppose the weight of the solvent to have been 40 grams, the portion decanted 26 grams, and the alkaloid obtained from this decanted fluid to have been 0·055 grams (=5·82 cc. of the reagent used). Then, $26 : 40 :: {\cdot}055 : x$, x being the quantity of alkaloid contained in the 2·5 grams of drug used. Solving the proportion, $40 \times {\cdot}055 \div 26 = {\cdot}0846$. Since the quantity of drug used was 2·5 grams, this result multiplied by 4, with the decimal points removed one place toward the right, will give the per cent. (approximately) of alkaloid in the drug, in the above example, 3·384 per cent.

The results I have obtained by this method of assay have, however, been unsatisfactorily low, and, until some of the details are a little more fully worked out, I regard it only as a plan promising well. I have substituted for the ether in this process petroleum benzin, and mixtures of chloroform and ether, the results in the former instance wholly disappointing, and in the latter not as satisfactory as where ether alone was used.

I believe that when experiment shall have determined what quantity of solvent is required, how much ammonia should be used, and how long the maceration should continue, the process will prove a good one, and it has this advantage over Dragendorff's process, that it is not liable to give results above the truth. In experiments recently made, I

obtained from the same ipecac, by Dragendorff's method, 2·64 per cent. emetine, by the same, modified as I have described in detail 2·72 per cent., by the ammoniated ether process 2·42 per cent.; by the same using a mixture of ether and chloroform 2·3 and in a second experiment 2·18 per cent.; ammonia and benzin extracted after 48 hours maceration only 1·12 per cent, and even when the maceration was carried on in a warm place the yield was only 1·32 per cent. Ammonia and boiling benzin, the process suggested for the manufacture of emetine, extracted 1·8 per cent. to 2 per cent.

Experiments made with chloroform as a solvent have given the best results yet obtained. One plan, which is both simple and rapid, is the following:

Place in a flask 5 grams of finely powdered ipecac, add a mixture of strong ammonia 1 gram, alcohol 5 grams, chloroform 30 grams. Set in a warm place half an hour, then apply sufficient heat to keep the mixture boiling for one hour; then add 50 cc. petroleum benzin, boil half an hour, add benzin enough to make the mixture measure nearly 100 cc., filter, and add through the filter enough benzin to make 100 cc. Of this take for the assay 25 cc., and treat as in the ammoniated ether process.

From the same ipecac as that used in the former experiments I obtained in this way 2·6 per cent alkaloid.

Still another experiment has given encouraging results. By using the menstruum which Messrs. Durstan and Short have found the most suitable for exhausting nux vomica, I found that ipecac could be easily and quickly exhausted. This menstruum consists of a mixture of three volumes of chloroform with one of alcohol. The ipecac, 5 grams, can be placed in an extraction apparatus, and treated by hot repercolation with about 40 cc. of the mixture. The alkaloid can be removed from the chloroform by washing repeatedly with acid water, and the acid fluid can then be titrated, or the alkaloid can be removed from it by rendering it alkaline and shaking repeatedly with chloroform, dried and weighed. The method is well adapted for exact assays, and in the analytical laboratory will doubtless be preferred to any other.

For the pharmaceutical chemist the treatment with chloroform and benzin is to be recommended, being very simple, rapid, and practical, provided further experience shall demonstrate its complete trustworthiness. With regard to both of these last described processes, although I feel confident that they more nearly satisfy the requirements of the

problem in hand than any that have heretofore been proposed, I have not had the time to elaborate their details sufficiently to warrant me in declaring the problem completely solved. I trust that this contribution to the discussion of the subject will be of some service in directing future effort towards its final solution.

The practical result of my experiment has had, at any rate, this outcome, that it has given me increased confidence in the method of Dragendorff, which I have heretofore regarded with a certain amount of distrust.

In concluding this paper, I have thought it might be of interest to give a summary of some of the results of the assays I have had occasion to make of ipecac, and of its preparations, premising that their results have been obtained by the use of Dragendorff's method of assay, when not otherwise stated.

Of 48 samples of crude drug examined 5 contained less than 2 per cent. emetine (minimum 1·65 per cent.), 10 contained between 2 and 2·5 per cent., 23 between 2·5 per cent. and 3 per cent., and 10 upward of 3 per cent. The following items of description are noted in connection with some of the samples:

	Per cent.
Thin roots, nearly black	2·2
Flesh colored, "bold" sample	2·85
Flesh colored, good appearance	2·1
Thin, dark root	1·65
"Bold" sample (white)	2·25
" "	2·75
Pale flesh color	3·00
White, bold, tender roots	2·7
" " woody	2·6
Dark colored, much broken	2·8

Solid extract of ipecac has ranged in content of alkaloid from 8.9 to 10·3 per cent. Powdered extract, from 6 to 7·5 per cent. Fluid extracts made by the U. S. P. process contain generally less than 1·5 per cent. Made by processes that do not involve the use of heat, the percentage is higher but does not generally exceed 2 to 2.25, and often falls short of this. The samples examined have been those of a number of manufacturing firms, and many of them are regarded as articles of excellent quality.

The time must very soon come when the alkaloidal strength of galenical preparations of all active drugs will be regulated by our official

standards. It rests largely with Associations like this one to cultivate the analytical investigations which will result first in fixing such authoritative standards, and then in securing such an education of the retail druggist as shall enable him to save the law from becoming a dead letter.

OCTOBER 8th, 1885.

PRODUCTS OF THE MEZQUITE.

BY HERMAN J. SCHUCHARD, PH.G.

Abstract from a Thesis.

On the hills surrounding San Antonio, Texas, the Algarobia glandulosa, *Torrey and Gray* (s. Prosopis juliflora, *De Cand.*), is a thorny shrub, branching directly at or a few feet above the ground; but on rich soil and under favorable conditions it becomes a tree 30 to 40 feet high. The legumes, which are somewhat constricted between the seeds, ripen in July and August, and are then yellowish white, mottled with red, four to six inches long, and contain 10 to 20 seeds. In the unripe state they are bitter, but at maturity have a sweet, pleasant taste, and have been sold by the bushel when grain was scarce in the "Alamo City." The Mexicans and Indians prepare a favorite dish from mezquite beans; after the seeds have been picked out, the pulp is ground into a coarse meal, well seasoned with "chile" (capsicum), wrapped in corn husks and boiled. The roots of the mezquite spread sideways for many yards, but others are said to dip into the ground sometimes 50 feet, thereby enabling the shrub to thrive during the hot and dry season. The wood of the mezquite is very hard, and takes a fine polish, but is usually too crooked and knotted to be used for cabinet work. It is brought to the San Antonio market by the Mexican "carrettas" and sold for fuel, for which it is unsurpassed; it is also used in fencing, and blocks of the wood have been employed to a small extent for paving sidewalks in San Antonio.

During the summer months a gum exudes from the stem and branches, which was brought into notice by Dr. Shumard, U. S. A., in 1854, and described by Prof. Procter (see "Amer. Jour. Phar.," 1855, pp. 14 and 223). The gum dissolves completely in an equal weight of water, in 24 hours, at a temperature of about 70°F., and forms a thick mucilage, of an acid reaction, which is not precipitated by subacetate of lead, or thickened to a jelly by silicates, borates or

ferric salts, but which, after acidulation with hydrochloric acid and the addition of alcohol, yields a white precipitate. The gum contains 12·6 per cent. of moisture, and on ignition leaves 2 per cent. of ash; this yields to water 26·229 per cent., containing potassium and a small amount of sodium, while hydrochloric acid dissolves 73·442 per cent., containing mainly calcium (about one-half the weight of ash), with small amounts of magnesium and aluminium. The gum is free from starch, and by boiling with hydrochloric acid is converted into glucose.

Gum mezquite does not appear to be much used at present, as the price of gum arabic is low; it is applicable to all purposes like gum arabic, though the dark-colored varieties may be objectionable in some cases. In medicine it does not only answer as well as gum arabic, but may be used with advantage occasionally, since its solution can be combined with basic lead acetate and with ferric salts without being precipitated. No doubt in time gum mezquite will become a commercial article of some importance. It is generally assorted, according to its color, into four varieties or grades.

NOTE BY THE EDITOR.—The Mexican Pharmacopœia contains some interesting information on the mezquite, supplementing that given above. The name "mezquite" is applied to Prosopis dulcis, *Kunth*; P. microphylla, *Kunth*, and P. juliflora, *De Cand.*; an extract is prepared from a decoction of the leaves, and this dissolved in water is known under the name of "bálsamo de mezquite," and used in various inflammations of the eye. The fruit is used as food, and by fermentation yields considerable alcohol; the colorless distillate has a peculiar odor, and when of from 50 to 60 per cent. strength is called "vino de mezquite." The gum is stated to be commonly mixed with another gum, probably obtained from Acacia albicans, which has a much darker color, and the solution of which is darkened by potassa, while the solution of gum mezquite is rendered white by this reagent; the distinction was ascertained by A. Morales in his comparative studies of the Mexican gums.

WINE OF COCA IN FATIGUE.—Dr. E. R. Palmer contributes to the *American Practitioner* for February an account of a physiological experiment made during a walking-match, upon the effects of coca in sustaining the system under prolonged muscular effort. The subject was a young girl of seventeen years, who was a professional pedestrian, but who was much reduced in strength by poor food and too great reliance upon alcoholic stimulants. The effect of the coca in sustaining muscular vigor were very marked. About a pint of the wine of coca was consumed. The distance traveled was three hundred and fifty miles in seven days.—*Columbus Med. Jour.*, May, 1885.

NEW METHOD OF TREATING SEA-WEED.

(*Condensed from the Report on the Chemical Industries at the International Inventions Exhibition, London*, 1885, *by Prof. Samuel P. Sadtler.*)

The exhibit of Mr. E. C. C. Stanford illustrates generally the manufacture of iodine, bromine and potassium salts from sea-weed, besides that of the new and interesting substance, *Algin*, first isolated and studied by Mr. Stanford; also many of the metallic alginates. It would appear that amongst sea-weeds, the algæ possess the power of assimilating the iodine from sea-water to about ten times the extent of the bromine, and that amongst the algæ the Laminaria and the Fuci are the kelp-producing species of the order referred to. The drift-kelp is made from two varieties of red weeds, or Laminaria, the *L. digitata* and the *L. stenophylla*. The former is known as tangle, and both kinds are always submerged. These sea-weeds, and especially the latter, are much injured by rain, and are often after drying almost valueless. If well preserved, the Laminariæ contain ten times as much iodine as the Fuci. It furnishes the only kelp now used for making iodine. The usual yield of kelp from 100 tons of wet sea-weed is 5 tons, and, as only half of this is soluble, two and one-half tons form the total valuable product of what may be called the *native process*, and this must pay for the labor of cutting, carrying, drying and burning 100 tons of wet sea-weed. As the people in burning the weed use such a heat as to produce a sort of slaggy mass, and lose thereby about half the iodine, Mr. Stanford proposed the so-called *char-process*, by which all the iodine is saved. The weed in this process is submitted to destructive distillation in iron retorts, leaving behind a loose porous charcoal, retaining the salts and the iodine, and yielding in the distillate ammonia, acetic acid and tar. In a still newer process—in fact, the one referred to in the title of the exhibit—Mr. Stanford extracts first the potassium chloride ("muriates"), potassium sulphate and "kelp-salt" (sodium chloride containing some carbonate and including the iodides), by simple maceration in cold water. The amount so removed from the air-dried Laminaria is about one-third of its weight (thirty-three per cent.), of which twenty to twenty-two per cent. are mineral salts, and the balance consists of dextrin, mannite and extractive matter, leaving two-thirds of the plant (sixty-six per cent.) for further treatment apparently unaltered. This residue contains the peculiar new substance, *Algin*, and the cellulose.

The comparison between the three processes is of considerable interest, as showing the advance made upon the old kelp process, so tenaciously adhered to and persisted in by the natives of the West Coast, by Mr. Stanford's "char" and "wet" processes.

Kelp Process.

Per cent. utilized, 18.

Kelp, 18 tons..... { Salts, 9 tons. / Iodine, 270 lbs. } { Residuals: kelp waste, 18 tons. Valueless. }

Char Process.

Per cent. utilized, 36.

Char, 36 tons..... { Salts, 15 tons. / Iodine, 600 lbs. } { Residuals: charcoal, 36 tons, tar and ammonia. }

Wet Process.

Per cent. utilized, 70.

Water extract, 33 tons. { Salts, 20 tons. / Iodine, 600 lbs. } { Residuals: algin 20 tons, cellulose 15 tons, dextrin, etc. }

In this new process, the sea-weed is to be exported and worked at a central factory, and all the common varieties can be used. The weed is first boiled with sodium carbonate, the solution is filtered and precipitated with sulphuric acid, the precipitate being the new substance, algin, which resembles albumen, and contains all the nitrogen, and, moreover, all that is nutritious in the sea-weed. The solution is now neutralized with limestone, the sulphate of lime deposited, the neutral solution evaporated down, and the sulphate of soda crystallized out. The mother-liquor, containing all the potash salts and iodine, is carbonized, forming the "kelp-substitute." The residue on the filter is the cellulose. The whole plant is thus utilized. (See table.)

Residue.	Soda Solution.		
	Precipitated by sulphuric acid.	Retained in solution.	
Cellulose.	Algin.	Sulphate of soda, crystallizes out as Glauber's salt.	Mother-liquor, carbonized is kelp-substitute.

Algin has fourteen times the viscosity of starch, and thirty-seven times that of gum-arabic. Algin or sodium alginate in solution is precipitated or coagulated by alcohol, acetone and collodion, but not by ether. It is precipitated by mineral acids, various salts, and by lime and baryta water. The solution is not precipitated or coagulated

by alkalies and alkaline salts, starch, glycerol and cane-sugar. It does not precipitate the ordinary alkaloids. It is distinguished from albumen, which it most resembles, by not coagulating on heating, and from gelose by not gelatinizing on cooling, by containing nitrogen, by dissolving in weak alkaline solutions, and being insoluble in boiling water. From gelatin it is distinguished by giving no reaction with tannin; from starch, by giving no color with iodine; from dextrin, gum-arabic, tragacanth and pectin by its insolubility in dilute alcohol and dilute mineral acids.

It is remarkable that it precipitates the salts of the alkaline earths, with the exception of magnesium, and also most of the metals; but it gives no precipitate with mercuric chloride or potassium silicate.

COMMERCIAL APPLICATIONS OF ALGIN, OR SODIUM ALGINATE.

For Sizing Fabrics.—As a finish, algin has the advantage over starch that it fills the cloth better, is tougher and more elastic, that it is transparent when dry, and that it is not acted upon by acids. It imparts to the goods a thick clothy, elastic feeling, without the stiffness imparted by starch. It has the advantage possessed by no other gum of becoming insoluble in presence of a dilute acid which decomposes starch or dextrin. No other gum having anything like the viscosity of algin in solution, none will go so far in making up the solution or cover such a large surface. *The alginate of alumina* in caustic soda is a stiff dressing, and in the crude unbleached state will be a cheap dressing for dark materials, and in the colorless for finer fabrics. *The ammoniated alginate of alumina* can be used to give a glossy surface, which is quite insoluble after drying.

As a Mordant and Dung-substitute in Dyeing and Printing.—Mr. John Christie, of the firm of J. Orr Ewing & Co., states that "there is another application of the alginate of soda, viz., in the fixing of mordants such as those of alumina or iron upon cotton fibre." Very encouraging results are said to have been obtained, and Mr. Christie believes a very large application will be found for alginate of soda as a "dung-substitute." This being the case, the substitution of so harmless a compound for one so poisonous as the generally used arseniate of soda should be welcomed and a fair trial accorded the new dung-substitute. In Germany, where the use of poisonous materials in connection with printing and dyeing textile fabrics is greatly restricted, if not altogether interdicted, one would imagine such a substitute would

when known be readily adopted. Mr. Christie continues: "The mordants when precipitated seem to have full dyeing power," which means that as a dung-substitute the alginate has done its work well.

As an Article of Food.—Algin contains carbon, 44·39 per cent.; hydrogen, 5·47; nitrogen, 3·77; oxygen, 46·57; or about the same amount of nitrogen as is found in Dutch cheese. For thickening soups and puddings, as a substitute for gum-arabic in the manufacture of jujubes and lozenges, and in making jellies, it is said that it would be very serviceable.

In Pharmacy.—It is said that it would be useful for emulsions of oils, as an excipient for pills, and for fining of spirits.

For Boiler Incrustations.—Mr. Spiller has proved that a solution of sodium alginate forms one of the best fluids for preventing boiler incrustation, as it quickly precipitates the lime from the boiler water in a state in which it can be easily blown off.

Algic Cellulose.—This substance bleaches easily, and under pressure becomes very hard, when it can be turned and polished with facility. It makes also a good paper, tough and transparent, but with no fibre. Alone, or mixed with algin and linseed oil, or shellac, it may be used as a non-conductor of electricity where a cheap material is needed.

The Sea-weed Charcoal.—It is proposed to use this in conjunction with algin for covering boilers, and such a composition has been largely applied under the name of "carbon cement." This is nearly all charcoal, three per cent. of the algin being sufficient to make it cohere. It forms a cool, light and efficient non-conducting covering.

PHARMACEUTICAL PREPARATIONS OF THE MEXICAN PHARMACOPŒIA.

By the Editor.

(Concluded from page 441.)

Tinturas, Tincturæ. Among the tinctures which are rarely employed here, the following may be mentioned, which are made in the proportion of 1:5:

Menstruum 80 per cent. alcohol; the tinctures of euphorbium and of all balsams, turpentines, gum resins and resins; also the tinctures of cloves, Winter's bark, fruit of Myroxylon, mace, nutmeg and contrayerva.

Menstruum 60 per cent. alcohol; the tinctures of arnica leaves, sabadilla, Artemisia mexicana, Hydrocotyle asiatica, cahinca, Aristolochia fragrantissima, Arris root, Cissus tiliacea, mustard and other seeds.

Tinture de raíz de Jalapa compuesta, Tinctura de radice jalapæ composita.—Jalap 40, turpeth root 5, Aleppo scammony 40, alcohol (60 per cent.) 480; macerate for 10 days and filter.

Triaca, Theriaca.—Powder the following substances: Gentian 40, ginger 20, valerian 20, anise 20, cardamom 20, pepper 10, cinnamon 20, myrrh 10, saffron 10, opium 10, ferrous sulphate 10, mix these powders with moderately warm honey 720 and add Sherry wine 40. Contains approximately 1 per cent. of opium.

Uncion fuerte, Unguentum cum Cantharidibus.—Marshmallow ointment 200, nervine ointment 100, powdered cantharides 25, pepper 25, euphorbium 12; mix. As a vesicant in veterinary practice.

Ungüento amarillo (basilicon), Unguentum pallidum s. basilicum.—Yellow Campeachy wax 500, mutton suet 500, colophony 1,000, sesame oil 800.

Ungüento bruno, Unguentum fuscum.—Mercuric oxide 20, burnt alum 10, basilicon ointment 150. Used as a detergent and for phagedenic chancres.

Ungüento contra escabia, Pomatum ad scabiem ex Alderete.—White wax 120, turpentine 250, lard 1,000, carbonate of lead 380, lemon juice 250, mercuric chloride 15, burnt alum 15, yelk of egg 6.

Ungüento de Altea, Unguentum Althææ.—Yellow Campeachy wax 500, colophony 500, oleoinfusion of fenugreek 900.

Ungüento de Agripa, Unguentum ex Agripa.—Take of squill, dry, 125, and the following drugs in the fresh state: leaves of Sambucus mexicana 500, root of Bryonia variegata 250 and root of Iris germanica 250, add sesame oil 2,000, boil gently until all the moisture has been expelled, express, strain, add for every 500 gm. of liquid 125 gm. of white wax and melt together.

Ungüento de Artánita compuesto, Unguentum Arthanitæ compositum.—Melt together white wax 150 and lard 2,500, add the following in fine powder: scammony 30, jalap 30, colocynth 30, aloes 30, sodium chloride 15, euphorbium 15, myrrh 15, pepper 15, ginger 15 and chamomile 15; agitate the mixture continually while cooling. Radix Arthanitæ is the tuber of Cyclamen europæum, which is not used in the foregoing formula, nor in that published by Hager in

"Phar. Praxis I," 934; it was, however, formerly used in such an ointment, for a formula of which see "Jourdan, Pharmacopée univ." (1828) I, 445.

Ungüento de Isis, Unguentum cum Acetate cuprico.—Yellow Campeachy wax 750, colophony 1,000, turpentine 250, lard 1,000, finely powdered verdigris and burnt alum, of each 80.

Ungüento de Mercurio doble, Unguentum Hydrargyri.—Melt together white wax 60 and lard 400; of this mix 100 parts with sweet gum (liquidambar) 40, and triturate with mercury 500, until completely extinguished; then incorporate with the remainder of the fatty mixture.

Ungüento de Osorio, Unguentum ex Osorio.—Suet 500, lard 1,000, strained sweet gum 120, oil of lavender 25.

Ungüento de todos Sebos, Unguentum Seborum.—Mutton suet 125, lead plaster 15, lard 500.

Ungüento del Corazon, Unguentum cordiale.—Finely powdered red saunders 30, compound rose powder 12, camphor 4, lard 500.

Ungüento de la Condesa, Unguentum Comtissæ.—Melt in a suitable vessel lard 600 gm., add 30 gm. each of finely powdered nutgalls, cypress cones, pomegranate bark and arrayan leaves and stir continually while cooling.

Ungüento encarnativo, Unguentum cum Oxydo plumbico rubro.—Red lead 60, lard 500.

Ungüento nervino, Unguentum nervinum.—Fresh rosemary and laurel leaves, each 250, lard 875, suet 386; digest until the leaves have become crisp, add yellow wax 98, express, strain and mix with oil of bricks (rapeseed or olive oil distilled from broken bricks), oil of rosemary and oil of juniper, each 15.

Ungüento santo, Unguentum cum Oxydo zincico et Subacetate cuprico.—Prepared tutty 30, verdigris 8, lard 500.

Vino cordial, Vinum cordiale.—Tincture of cinnamon 10, red wine 90.

Vino de Catecú, Vinum cum Catechu.—Tincture of catechu 80, Sherry wine 1,000.

Vino de Escila, Vinum scilliticum.—Squill 30, sugar 15, alcohol (60 per cent.) 30, Sherry wine 470; macerate for 10 days, express and filter.

The wines of rhubarb and of the root and seeds of colchicum are made in the same manner.

Vino de extracto de Quina y Fosfato férrico-citro-amoniacal del

Dr. Hidalgo Carpio, Vinum cum extracto Cinchonæ et Phosphate ferrico-citro-ammoniaco ex Hidalgo Carpio.—Citro-ammonio-ferric phosphate 8, extract of gray cinchona 2, Sherry wine 600.

Vino de Quina Calisaya, Vinum de Cortice Cinchonæ Calisayæ.—Calisaya bark 30, alcohol (60 per cent.) 60; macerate for 24 hours, add sugar 30 and Sherry wine 940, and after 10 days maceration express and filter.

In the same manner, but doubling the proportion of the drugs, are prepared the wines of red and gray cinchona, colombo, quassia, gentian, Artemisia mexicana, coca and jaborandi.

Vino de Yoloxochitl, Vinum de floribus Magnoliæ mexicanæ.—Tincture of magnolia flowers (see page 290) 100, Sherry wine 900.

Vino de Zarzaparrilla, Vinum cum extracto Smilacis medicæ.—Alcoholic extract of sarsaparilla 120, alcohol (60 per cent.) 60, Sherry wine 700, clarified honey 120.

Vino ferruginoso, Vinum martiatum.—Ammonio-ferric citrate 5, sugar 30, Sherry wine 1,000.

We have given in several numbers of the JOURNAL under the title of this paper all the formulas of the Mexican Pharmacopœia, which appear to us to be unique; in addition to these a large number have been admitted which are identical with those of the present or former French Codex.

GLEANINGS FROM FOREIGN JOURNALS.

BY GEORGE H. OCHSE, PH.G.

An almost tasteless tannate of quinine is obtained by dissolving 60 Gm. tannic acid in 11 Gm. of water, without heat, and adding 11 Gm. of a 2 per cent. solution of sodium bicarbonate, and enough water, if necessary, to make a clear solution. To this solution is added a solution of 40 Gm. quinine sulphate in 27 Gm. of dilute sulphuric acid and 11 Gm. of water. The precipitate is washed on a linen strainer until the washings cease to have an alkaline reaction; it is then dried and powdered. Prepared thus, tannate of quinine contains about 33⅓ per cent. of quinine, and is cheaper than the commercial article, which frequently contains but 20 per cent. of quinine.—*Pharm. Centralhalle.*

Fixed Oils as Solvents for Iodine.—A 20 per cent. solution of iodine in castor oil forms a thick brown liquid; the solution in olive oil or almond oil is of a reddish brown color, and not so thick. The castor

oil solution can be diluted with alcohol, thus overcoming the disagreeable effects produced by an alcoholic tincture. A formula for tinctura iodi cum oleo ricini is as follows: ℞ Iodine 10, castor oil 45; dissolve with a moderate heat and add alcohol 45.—*Arch. d. Pharm.*

Emulsion of Cod Liver Oil.—The following is said to be a good formula: Olei morrhuæ, 62; acaciæ pulv., tragacanthæ pulv., marantæ, *aa* 1; syrupi, 10; aq. destill., 55. Mix the powders in a mortar and add the oil; pour into a bottle, add 31 of water, and shake for 10 minutes. When the oil is emulsified the syrup and balance of the water are added.—*Schweiz. Wochenschrift.*

Quillaia bark is recommended as being preferable to senega by Dr. Kobert who states, as the result of his experiments, that quillaia contains two glucosides which are identical with the glucosides of senega, quillaia containing about five times as much as senega. He administers it in decoction (5:200), and owing to its sweet taste it is very readily taken by children, seldom producing vomiting or diarrhœa.

Detection of Cyanides in the Presence of other Salts.—Mr. W. J. Taylor distils with sodium bicarbonate instead of tartaric acid. In thus distilling a 10 per cent. solution of ferrocyanide of potassium no trace of hydrocyanic acid was found, while in the distillate from a $\frac{1}{100}$ per cent. solution of potassium cyanide, treated with ammonium sulphide to form sulphocyanate of ammonium, hydrocyanic acid could readily be detected. To cyanide of mercury a piece of metallic zinc must be added. The presence of sulphate of potassium, ferrocyanide or ferridcyanide of potassium, and of ammonium salts, does not affect the reaction.

Sulphuretted hydrogen free from arsenic is readily obtained, according to Dr. Gerhard, by heating a solution of sulphide of magnesium (made by passing H_2S into milk of magnesia) to about 60°C.; when the temperature has reached about 95°C. the reaction will be over. As milk of magnesia absorbs hydrosulphuric acid slowly, it can be made more quickly by decomposing the alkaline hydrosulphates with chloride or sulphate of magnesium.—*Arch. d. Pharm.*

Characteristic Reaction of Digitalin.—According to Lafou, a trace of digitalin can readily be detected by mixing the suspected substance with a mixture of equal parts of alcohol and sulphuric acid, heating until a yellow coloration is produced, and then adding a drop of solution of chloride of iron; if digitalin is present, a blue-green color is produced, lasting for several hours. This reaction is very delicate;

the coloration produced by 1 milligram of digitalin is very distinct.—*Schweiz. Wochenschr.*

Rust and ink stains can be removed by moistening the spots, and rubbing on them a mixture of 2 parts cream of tartar and 1 part of oxalic acid. When the stain disappears it is washed out with water. This mixture does not affect the fabric, and hence is preferable to oxalic acid alone.—*Rundschau.*

Paraldehyde suppositories can be made by fusing paraldehyde with 20 per cent. of paraffin, and dispensing in hollow suppositories.—*Fortschritt.*

Liquor Thioticus s. Sulphuratus.—Under this name Dr. Hager uses a solution of 0·2 washed sulphur in 5 cc. of carbon bisulphide, to which 5 cc. benzol and 10 cc. of ether are added, as a substitute for sulphide of ammonium or sulphydric acid. The benzol and ether are added to make the liquid lighter than water. He proceeds as follows: A small quantity of solution of caustic soda is added to some of the test liquid; the substance to be examined is then added and the mixture heated to boiling, agitating constantly. To test for arsenic, antimony and tin, muriatic acid is added after the evaporation of the ether. Liquor thioticus is readily prepared and free from the disagreeable odor of sulphuretted hydrogen.—*Rundschau.*

MATERIA MEDICA OF THE NEW MEXICAN PHARMACOPŒIA.

BY THE EDITOR.

(Continued from page 507.)

Chile. The different species of Capsicum, growing wild or cultivated in Mexico, and used medicinally or for condiment, are the following: pasilla, C. longum, *De Cand.;* ancho, C. cordiforme, *Mill.;* mulato, and in the unripe state poblano, probably a variety of the preceding; valenciano, C. dulce, *Hort.;* tzincuayo, C. violaceum, *H. B. K.;* quanchilli, C. frutescens?; chiltipiquin de Papantla, C. annuum, *Lin.*, and chiltepin de Jalisco, C. microcarpum, *DeCand.*

Chilillo, Polygonum Hydropiper, *Lin.*, is used in baths against rheumatism, and internally in the form of infusion, as a diuretic. Pol. aviculare, hydropiperoides and other species are said to be frequently substituted for the former.

Chirimoyo, Anona Cherimolia, *Miller;* Anonaceæ; in warm and damp regions. The fruit is nutritious. The seeds, slightly roasted, are violently emeto-cathartic in doses of one to twelve, and are too dangerous for medicinal use; externally they are insecticide. Garza Cortina of Mexico (1872) found the seeds to contain sugar, gum, albumin, extractive, salts, fixed oil and an acrid resin soluble in alcohol, ether and chloroform and representing the active principle.

Chochos, Lupinus albus, *Lin.;* Leguminosæ; cultivated. The seeds were formerly used as an aphrodisiac and vermifuge; the decoction is employed in the form of injection in external otitis; also as a discutient.

Damar (dammar), Datil (dates), Díctamo blanco (Dictamnus albus), Díctamo de Creta (Origanum Dictamnus), Digital, Duboisia, Dulcamara, Eléboro blanco (Veratrum album), Eléboro negro (Helleborus niger), Eléboro verde (Hell. viridis), Encina de mar (Fucus vesiculosus, Enebro comun (Juniper berries), Eneldo (dill), Enula (elecampane), Escamonéa (scammony), Escila (squill), Escordio (Teucrium Scordium), Espárrago (asparagus roots and shoots), Esperma (spermaceti), Esponja (sponge), Estafisagra (staves acre), and Eucalipto (Eucalyptus globulus), are foreign drugs admitted into the Mexican Pharmacopœia. The eucalyptus, asparagus, dill and a few others are cultivated in Mexico.

Damiana, Aplopappus discoidèus, *H. B. K.;* Compositæ; in the valley of Mexico, etc. Used in baths against rheumatism. The plant does not possess any aphrodisiac properties which have been claimed for it.

Díctamo real, Passiflora Dictamus, *Fl. Mex. ined.* and P. mexicana, *Jussieu;* Passifloraceæ; in the State of Morelos and other hot districts. The former species has simple two-lobed leaves, the lobes oblong and three-nerved, the base subemarginate, the peduncles one-flowered and the tendrils simple. The second species has the base of the leaves rounded, their lower side glandular and the petioles shorter. The leaves and stems are used in decoction in bronchial and pulmonary affections. The leaves of the "granadita de China," Pass. cærulea, *Lin.* probably have similar properties; the fruit is used for food, and the root is said to be emetic. Marrubium Pseudodictamnus *Lin.* is also known in Mexico by the name of díctamo.

Diente de leon, Taraxacum mexicanum, *De Cand.;* Compositæ; in Mexico. The root and leaves contain a milk juice, without particular odor, bitter, somewhat sweet and slightly acid. The root is blackish

externally and white internally. The leaves are radical, rosulate, and irregularly and triangularly lobulate. The constituents are probably analogous to those of Taraxacum Dens-leonis. The root is employed as a substitute for chicory.

Doradilla, Lycopodium nidiforme, *Flor. Mex. ined.*, Lycopodiaceæ; in the valley of Mexico. The decoction is employed in biliar lithiasis, and as a sedative in hepatic colics.

Durazno, Persica vulgaris *De Cand.;* Rosaceæ; cultivated in Mexico. A syrup is prepared from the flowers, which, like the leaves contain hydrocyanic acid, the latter being sometimes used as a substitute for cherry laurel leaves. The seeds are incorrectly called bitter almonds. The fermented pulp of the fruit produces an agreeable alcohol.

Ecapatli, Cassia occidentalis, *Lin.;* Leguminosæ; in the State of Mexico. The leaves are believed to have the properties of senna leaves.

Encina, Quercus polymorpha, *Schlechtendal*, Q. barbinervis, *Bentham*, Q. tomentosa, *Willdenow*, and other species are used, the bark being astringent; the fruit, called bellota (see p. 385) is roasted like coffee.

Epazote, Chenopodium ambrosioïdes, *Lin.;* indigenous. The entire plant is used as a condiment, and medicinally as an anthelmintic, emmenagogue and in chorea; an infusion is made of 20 Gm. to the liter.

Escila del pais, Pancratium illyricum, *Lin.;* Amaryllidaceæ; cultivated in Xochimilco, etc. The bulbs are 45 to 60 Mm. thick, napiform, scaly, externally reddish-brown, internally whitish; have a slightly nauseous odor, and a sweet, afterward bitter taste, and possess diuretic and hyposthenic properties. Dose 0·10 to 0·20 Gm.

Escoba amarga, probably Milleria linearifolia, Compositæ. The plant is common in the valley of Mexico and flowers in September. Stem herbaceous, almost filiform; leaves alternate, sessile, linear; involucre of 3 to 5 bracts; receptacle not chaffy; ligulate florets pistillate; tubular florets staminate; akenes smooth and compressed. Bitter, tonic; dose 4 to 8 Gm. in infusion. The different species of Milleria have opposite leaves.

Escorzonera de México, Pinaropappus roseus, *Lessing;* Compositæ; in the valley of Mexico. An infusion of the plant is used in diarrhœas.

Espinosilla, Hoitzia (Lœselia, *Don*) coccinea, *Cavanilles;* Polem-

oniaceæ; in the valley of Mexico, etc. Dr. Oliva found the plant to contain greenish-brown resin, tannin, gallic acid, bitter extractive and salts. The infusion is diuretic and diaphoretic, and in larger doses, emetocathartic.

Esponjilla, probably Luffa purgans, *Kunth;* Cucurbitaceæ; in the State of Guerrero. The aqueous infusion of the fruit has a very bitter taste and drastic properties.

Estafiate, Artemisia mexicana, *De Cand.;* Compositæ; near the capital and in the valley of Toluca. Leaves on the upper side dark green, on the lower side ash colored, strongly aromatic, bitter, and of a warm taste, amplexicaul, quinque-pinnatisect, pubescent, the lobules trisected and the final divisions linear. In Oliva's Farmacolgia the plant is named Art. laciniata, which is cultivated in Guadalajara. Rio de la Loza obtained from the plant a blackish-gray extractive, bitter nitrogenated and bitter resinous principle, yellow volatile oil, starch, salts, etc. Alcohol and water take up the medicinal principles. The plant is tonic, stimulant, emmenagogue and anthelmintic. Dose 2 to 4 Gm. in powder; 4 to 15 Gm. in infusion; 1 to 4 Gm. of the extract; 1 to 6 drops of the volatile oil; the latter is generally used externally, mixed with a fixed oil.

Flor de encino de Puebla is the name given to the staminate catkins of the different species of quercus; which are reputed to possess antispasmodic properties.

Flor de noche-buena, Euphorbia pulcherrima, *Willdenow;* Euphorbiaceæ; on the western slope of the Sierra Madre, and cultivated in gardens. The bracts are used; they are short-petioled, lanceolate, attenuate below, penninerved, entire on the margin, fresh of a blood-red color, and dark violet-red after drying. T. Artigas (Thesis, 1880) obtained resin, yellow and red coloring matters, tartaric acid, glucose, saccharose, gum, starch and salts. The decoction, made of 8 Gm. of the bracts and 500 Gm. of water, and taken in two portions during the day, is reputed to be galactophorous; is used as a fomentation in erysipelas, and in the form of cataplasm as a resolvent. The milk-juice is used as a depilatory.

Flor de San Juan, Bouvardia longiflora, *Kunth;* Rubiaceæ; in the southern mountains of the Mexican valley. The flowers are used in perfumery.

Flor de Santiago, Amaryllis formosissima, *Lin.;* Amaryllidaceæ; in the State of Puebla. The bulb is emetic.

Fresno, Fraxinus viridis, *Michaux;* Oleaceæ; Central Mexico. The root is popularly used as a diuretic, and the bark as a tonic and febrifuge; the juice of the leaves is similarly employed. The tree is indigenous to the greater portion of the North American continent from Canada westward to Dakota and Arizona.

The following well-known drugs have been admitted: Fresa (strawberry root and fruit), Fumaria officinalis, Galanga, Gálbano, Gelsemio (Gels. sempervirens), Goma arábiga, Goma elástica (India rubber), Goma guta (gamboge), Goma de Mezquite, Goma quino (kino), Goma del Senegal, Goma tragacanto, Gomo-resina amoniaco, Gomo-resina de euforbio, Grama (Triticum repens), Granado (root-bark, flowers, pericarp and fruit-juice of pomegrante), Grasilla (sandarac), Guayacan (guaiacum), Haba (bean), Haba de Calabar, Haba tonca, Helecho macho (male fern), Hiel de toro (ox gall), Higos (fig), Higuerilla (seeds of Ricinus communis for extracting the oil), Hinojo (fennel), Huevo de gallina (egg) and Huitlacoche (cornsmut).

MILK AS A VEHICLE FOR IODIDE OF POTASSIUM.—Dr. E. L. Keyes, speaks highly of milk as a vehicle for the administration of iodide of potassium. He says that in cases where a large quantity of the drug has been given, he has found that the stomach does not rebel when milk is used as the vehicle. Ten grains or more of the iodide in a gill of milk make a palatable drink, and impart only a mild metallic taste to the fluid, which most patients find not at all disagreeable.—*N. Y. Med. Jour.*; *Cinci. Lancet*, May 23, 1885.

INTRA-UTERINE INJECTIONS OF CORROSIVE SUBLIMATE.—Winter ("Ctrlbl. f. Gyn.;" "Cntrlbl. f. d. ges. Therap.") regards solutions of corrosive sublimate as generally employed, as being too strong, and affirms that in the proportion of one to five thousand all the antiseptic action of the drug can be obtained, without incurring the risk of occasioning toxic symptoms.—*N. Y. Med. Jour.*, May 9, 1885.

OZONEIN is stated to be condensed ozone preserved in a permanent form, and to possess powerful disinfectant properties. Brand found it, when evaporated in hospital wards to be a valuable means of purifying the atmosphere. It was used with excellent results during the cholera epidemic at Toulon.—*Jour. de Méd., Paris.*

VERATRINE IN MUSCULAR TREMOR.—Féris (Jour. de méd. de Paris,") recommends this drug in muscular tremor, especially when due to alcoholism or disseminated sclerosis. He gives four pills daily, each containing one one-hundred and twenty-eighth of a grain. A cure, he says, may be confidently expected in from a week to two weeks.—*N. Y. Med. Jour.*, May 23. 1885.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

The sugar of senna leaves was isolated by Kubly in 1865, and named cathartomannit. Alfred Seidel has further examined this substance for which he proposes the name *sennit* and published his results in an inaugural essay, Dorpat, 1884. The most satisfactory process for preparing this sugar was by concentrating in vacuo the aqueous infusion of the leaves, precipitating mucilage and salts from the syrupy liquid by two volumes of strong alcohol, filtering, distilling off the alcohol, diluting the residue with water, digesting for 24 hours with oxide of lead, again evaporating in vacuo to a syrupy consistence, crystallizing upon flat plates over burned lime, which requires 4 or 5 weeks, and purifying by recrystallization from methyl alcohol and washing with absolute alcohol. Thus prepared sennit has the composition $C_6H_{12}O_5$ and forms colorless microscopic hemiedric crystals of the rhombic system, mostly sphenoïds with curved sides. It has a very sweet taste, melts at 183°C. (corrected 185·6°), and is soluble at ordinary temperature (about 20°C.) in 1¾ parts water, 450 absolute alcohol, 48 alcohol of 90 per cent., 82 methyl alcohol, and about 10,500 parts of absolute ether. It is dextrogyrate, unfermentable, prevents the precipitation of copper and iron salts by alkalies, and does not reduce Fehling's solution (also not after boiling with acid), silver nitrate, or solutions of gold or platinum. By treatment with diluted nitric acid, it yields oxalic acid, but no mucic acid. On evaporating sennit with an excess of diluted nitric acid, a snow-white mass is left which dissolves with an intense yellow or yellow-red color in ammonia, and with a yellow color in sodium acetate; on the addition to the ammoniacal solution of a drop of barium chloride solution, a reddish brown precipitate is produced, the liquid gradually becomes rose-colored and on spontaneous evaporation leaves a raspberry-red residue. Similar colorations are produced by strontium chloride, but the residue is in transmitted light rose-colored, while in reflected light it is green and has a metallic lustre. These characteristic color reactions are at once produced in the solution in sodium acetate mentioned above. Inosit, quercit and probably pinit, give a similar reaction, but not mannit, dulcit, glucose or saccharose. Compounds with calcium, barium and lead were prepared, also an acetyl compound, showing sennit to be a pentatomic alcohol.

Oranges as a galactagogue. A case is reported in the "N. C. Med. Jour." in which the eating of oranges proved beneficial in deficient milk secretion, causing a plentiful flow of milk.

Capparis coriacea, Burch, is a South African shrub, without spines and with oblong obtuse and glabrous leaves. The fruit of a Chilian plant to which the same name is applied by Dr. Larrea y Quesada (*Boletin Medico*) is recommended in nervous complaints, hysteria, epilepsy, etc., the powder being given in wine in doses of about 45 Gm. taken twice a day.

Similar properties have long been attributed to Capparis cynophallophora, *Lin.*, which is a shrub or small tree with very variable coriaceous leaves either orbicular, oblong or linear, and a linear silique-shaped fruit. This plant grows in the West India Islands and from Panama southward to Guayaquil and Bahia. The root of another West Indian shrub, Capparis siliquosa, *Lin.*, now regarded as a variety of C. jamaicensis, *Jacquin*, has likewise been used as an anti-hysteric, but also as an aperitive and anthelmintic; its leaves are silvery tomentose or pale rusty beneath, glossy above, elliptic or lance-oblong in shape and pointed while the variety emarginata has obtuse or emarginate leaves. These and some other West Indian species are stated by Baillon to be acrid and even vesicant.

C. spinosa *Lin.*, which yields the well known capers and is indigenous to the Mediterranean basin, is stimulant, antiscorbutic, diuretic and aperient, and similar properties are ascribed to several Egyptian and East Indian species.

Andira inermis, Kunth. The bark of this West Indian tree is again recommended as an anthelmintic by Midy (*Nouv. Remèdes.*) For use an ounce of the bark is boiled in a quart of water until the decoction has become of a wine color, the average dose for an adult being two ounces. It should be administered in small doses gradually increased, the occurrence of nausea being regarded as proof that the maximum dose has been attained; in overdoses it is said to be narcotic. The active principle is said to be a glucoside *andirin.*

This bark has been known and occasionally medicinally employed since the middle of the eighteenth century. Hüttenschmidt (1824) isolated from it an alkaloid which was named *jamaicine*, but was by Gastell (1866) shown to be identical with berberine. The name *andirin* was given by Peckolt (*Archiv d. Phar.*, 1858, vol. 146, p. 38) to a brown-yellow coloring matter, which may perhaps be identical

with berberine, and which was obtained from the wood of Andira anthelmintica, *Bentham.* In addition to this the wood contains a soft pungent and bitter resin, soluble in ether and alcohol, but insoluble in chloroform; this it seems has drastic and anthelmintic properties, and is also contained in the seeds, which are used in Brazil for their vermifuge properties under the name of *angelim amargosa.*

Evodia longifolia, nat. ord. Rutaceæ, is a native of the Fiji Islands. The leaves are said to be useful as a preventive of abortion; they are steeped in the milk of the cocoanut, the infusion being taken for several weeks or months.

A Brazilian species Evodia (Esenbeckia, *Martius*) febrifuga, *Saint Hilaire* is astringent and tonic, the bark having been occasionally used in the place of angustura bark (see *Am. Jour. Phar.*, 1874, 50, 414); it is known in Brazil in different provinces as quina, tres folhas vermelhas, or laranjeira do matto.

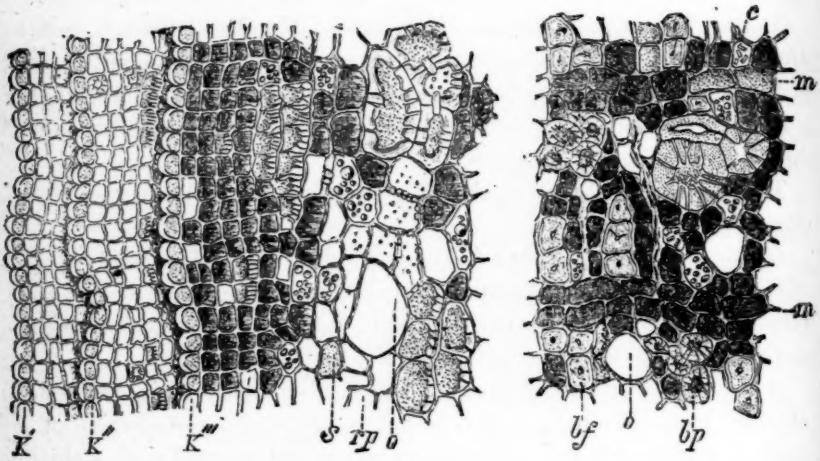
The bark of the Japanese Evodia glauca contains berberine (see *Am. Jour. Phar.* 1879, 26.)

Grindelia robusta, Nuttall, is recommended by Dr. Gatchell (*N. Y. Med. Times*) as a topical application in the treatment of stings and bites of insects. A lotion prepared with it is stated to stop the itching and promote the healing of the mosquito or flea bites.

A false clove bark or clove cinnamon has been received by Dr. John Moeller, from Hamburg. It is in flat pieces of about the width of a hand, 7 mm. or less thick, cinnamon brown and covered with a thick, warty, ash-gray or yellowish green cork; the odor has a resemblance to sassafras, and the taste is sharp, entirely unlike cloves and cinnamon. The periderm is sharply defined; a sclerenchyme ring is not observable; the middle bark is indistinctly dotted, and the inner bark darker and striate from delicate wavy medullary rays.

Under the microscope the cork is seen to consist of a number of layers, sometimes twelve or more, the cork evidently having been developed centripetally from the epidermis, and the layers corresponding to different periods of vegetation, terminating with a row of cells resembling epidermal cells, with the outer wall rounded and thickened, while the remaining cork cells are nearly square, rather thick walled, and occasionally with a cushion-like thickening of the inner wall. Secondary cork has not been observed. The parenchyme of the middle bark (phelloderm) contains numerous scattered cells with sandy crystals of calcium oxalate, and somewhat larger oil cells with colorless

volatile oil, and many cells have their walls, particularly the inner one, materially thickened. The inner bark contains rather indistinct medullary rays, of one to four rows of cells; the bast parenchyme is often sclerose, the cells being staff-like or much enlarged and deformed; sieve tubes are present in rather distant groups; the crystal cells frequently contain several well-formed prisms; the bast fibres are single or in interrupted tangential rows, are spindle-shaped, about 0·5 mm. long, 35 micromm. broad, colorless, and upon cross section roundish rectangular and with a very fine cavity.



False clove bark—transverse section. *K'*, *K''*, *K'''*, layers of cork; *rp* bark parenchyme; *s* crystal cell containing sandy oxalte; *o* oil cells; *m* medullary rays; *bf* bast fibres; *bp* sclerotic bast parenchyme; *c* crystal cell.

The parenchyme cells contain a homogeneous or granular red-brown mass, insoluble in alcohol, partly soluble in water and alkalies, and colored green by iron salts. The bark is doubtless derived from a laurel, probably a species of cinnamomum; but it does not resemble any officinal bark, and in substance as well as powdered, it is easily distinguished from cinnamon by the large number of stone cells and the presence of staff cells, from clove bark by the presence of bast fibres, and from both by the deep brown-red contents of all parenchymatous cells. ("Phar. Centralh." 1885, 251–253.)

Guachamacá. Dr. Kobert, of Strassburg ("Phar. Zeitung," 1885, No. 51), gives the history of this plant, of which the following is a brief abstract:

Guachamacá was first mentioned in 1841 by A. Codazzi, in a geographical work, and erroneously referred to Ryania coccinea. In his "Scenes of South American Life" (1862), Ramon Paéz, who had not seen the plant, gave an account of its poisonous properties. R. de Grosourdy (1864), in his "Medico criollo botánico, described the plant under the name of Guachamaca toxifera, and having seen only bad specimens of flowers and no fruit, correctly referred it to the Apocynaceæ. In 1869 Ernst, of Caracas, procured a leafy branch and two small roots, which were experimented with by A. Frydensberg with the result that the branch was found to contain a potent poison, and the root to be not poisonous. Joseph Hooker then supposed the plant to be a species of Prestonia. The wood, leaves, flowers and fruit, which were exhibited at the Exposición de Centenario por la Sociedad Patriotica de San Fernando de Apure (1883), furnished the material from which Ernst (1884) determined the plant to be a Malouetia, and Hooker recognized it as Malouetia nitida, *Spruce.* Frydensberg (1882) ascertained that the aqueous extract of the bark used on animals, produces paralysis without apparently disturbing the sensibility. Carl Sachs, who had collected (1876) a quantity of the plant in Venezuela, subsequently determined that the action of the poison resembles that of curare, and after his death an alkaloid, *guachamacine,* was isolated by J. Schiffer (1883) which possesses the action of curare and closely resembles curarine, though probably not identical with it.

Kobert now directs attention to the difference in origin of the various kinds of curare as had been ascertained by Planchon, and that the best curare comes from the Orinoco and Rio Negro where the guachamacá plant appears to be not scarce; also that the properties of the guachamacine indicate its identity with curarine, and he urges that the former be carefully studied, both chemically and physiologically.

The history as given above is contained in a pamphlet by A. Ernst, entitled El Guachamacá and published in Caracas 1885; from this we condense the following botanical description:

A shrub 4 or 5 meters high; bark rather thin, either ash-gray (guachamacá blanco) or dark colored (g. negro), longitudinally striate; wood yellowish white, branches opposite, the bark with numerous small white lenticels. Leaves, simple, entire, short-petiolate, elliptic-lanceolate, narrowed below, sharp pointed, apple-green and glossy above, paler beneath, 10 or 12 cm. long, 3 or 4 cm. broad, the nerves forming near the margin a curved line, the bases of the opposite petioles almost

united by broad membranous false stipules, which are caducous and leave a transverse scar. Flowers in axillary groups; calyx five-parted, membranous on the margin, the divisions triangular and scarcely acute; corolla salver-shaped, yellowish, exceeding the calyx, the tube about 1 cm. long, the limb five-parted, and on the inner side white hairy; stamens 5, inserted in the throat, the anthers connivent. Ovary round, with a slight furrow, hairy above and surrounded by a nectary of 5 rather large glands. Style filiform, the glandular stigma projecting from the anthers. Follicle round, dehiscent by the ventral suture, 15 or 16 cm. long, 5 or six mm. thick, striate, dark gray. Seeds 7 or 8, nearly cylindrical, obliquely truncate, with a longitudinal furrow, about 2 cm. long, gray, not hairy, the endosperm thin and adhering to the testa; radicle superior, about 2 mm. long; cotyledons elliptic, 10 to 12 mm. long, adhering above.

Pangium edule, Reinwardt; nat. ord. Bixaceæ. Attention has been recently directed by Chatel ("Jour. de Méd. de Paris") to the medicinal properties of this tree which are well known in the East Indian islands, where the tree is indigenous and cultivated. It attains a considerable size, and has alternate, stipulate, long-petiolate, smooth and dark green leaves, which are about 10 inches long, cordate, entire or trilobed and five- to seven-nerved. The large flowers are axillary, the pistillate ones solitary and the staminate ones cymose. The fruit is a large globular or ovate indehiscent berry with a red-brown or gray-brown punctate pericarp resembling that of the pomegranate. Imbedded in the pulp are numerous seeds attached to parietal placentas, and of an irregular globose and angular shape, one side being marked by the elongated hilum; the testa is hard and woody, dark gray or blackish, rough from projecting branching veins forming an irregular network, and encloses a fleshy and oily albumen surrounding a large embryo with a conical oblique radicle and with two foliaceous, palmately veined cordate cotyledons.

According to Blume, quoted by Baillon, the plant contains a viscous extractive matter and an alkaloid resembling menispermine. All parts of the plant are said to possess anthelmintic properties, and a narcotic action, producing headache, drowsiness, nausea and a kind of intoxication and delirium, which may terminate in death. This applies to the bark, leaves, fruit and seed, the bark as well as the leaves being also used for stupefying fish. The leaves have an unpleasant acrid taste and are often employed topically against cutaneous affections and ulcer-

ations. The seeds are used for destroying body lice; after boiling and subsequent maceration in cold water, or after being roasted they are harmless and are used as a condiment. A fixed oil is obtained from them which has a nutty flavor and is used like olive oil in preparing aliments, but has a purgative action upon those not accustomed to its use.

Pangium is botanically related to Gynocardia (chaulmugra) and Hydnocarpus.

THE BALATA INDUSTRY IN BRITISH GUIANA.

A very interesting and detailed report on this subject has been furnished to the Government by Mr. G. S. Jenman, Government Botanist, and Superintendent of the Botanic Gardens, Demerara. The report is especially valuable, as it it deals with a substance which has attracted a considerable amount of attention at different times for several years past, but has never found its way into commerce in any considerable quantity, though balata has always been highly spoken of, as Mr. Jenman reminds us, as intermediate in character between india rubber and gutta-percha, combining the properties of both, and for certain purposes is better adapted than any other of the natural caoutchouc substances. "Its strength also is very great, and, as it does not stretch under tension, for special appliances, such as bands for machinery, it is unequaled. It has recently been pronounced by an American firm of manufacturers as the 'best gum in the world,' and that it has not had a greater success is due more to the hitherto limited supply than to any defect of quality intrinsically in itself." This opinion is fully borne out in a report by Dr. Hugo Muller, F.R.S.

Balata, as many of our readers will already know, is the concrete milky juice of *Mimusops globosa*, Gaertner. A large, hard-wooded forest tree, sometimes reaching a height of 120 feet, and ranging from Jamaica and Trinidad to Venezuela and French Guiana. The introductory part of Mr. Jenman's report is devoted to a sketch of the balata tree in Berbice, with notes on the characteristic vegetation. Speaking of the savannah region, he writes as follows: "The flora I found naturally very largely identical with that of the Corentyne savannah, which, though remote, are part of the same region. It presents great variety, is generally rich in color, and very interesting. Flowers are not plentiful enough, though abundant, and in many

instances beautiful in an exceptional kind of way, to give color to the ground; they are partly concealed, too, by the rather long grass, yet it would be difficult to gather anywhere a more charming bunch of wild flowers than this savannah afforded at the time of my visit. Much of the novel effect is due, I have no doubt, to the exquisite shades of color above alluded to, combined with unusual and unique or quaint forms." A list of the plants seen follows this description. Some of the discomforts of the savannah are stated to be small flies, one of which swarms about the face and creeps into the eyes, and the other "stings and leaves a durable extravasated red speck." After a few notes on the population and their mode of living, a very careful description is given of the balata tree and its distribution. From the east bank of the Berbice river to the Corentyne is the region of its greatest plentifulness in the colony, but its distribution extends still eastward beyond the Corentyne into Dutch Guiana, where a grant of several hundred thousand acres has recently been acquired by an American firm for collecting balata. The trees are more plentiful in this region, in the depths of the forest, than near the rivers, hence the creeks form arteries to the balata grounds. Several of the creeks on both banks of the Cauje are instances of this. The woodcutters of this district regard the balata tree as inexhaustible; in the interior of the forest it exists in profusion, and abundance lies beyond the reach of the balata collectors as they at present conduct their operations. As the trees near at hand become exhausted they will no doubt alter their habits and make clearings as drying places in the heart of the forest, but now they are under the obligation of returning to the settlements on the creeks with the milk they have collected to dry. Under this necessity they can at most only penetrate about two days' journey, but so far as they have explored they report there is no diminution in the abundance of trees. The forest at this depth, of course, has never been touched by woodcutters, as for convenience in getting their timber out they have to confine their operations to the banks of the river and creeks, rarely going in more than a mile or two.

The balata collector's life is described as a very hard one, as the ground is not only swampy, but often up to the armpits in water; moreover, they are often badly clad and short of food, they consequently suffer much from rheumatic affections.

The trees are tapped either standing or after felling. In the former position gashes are made through the bark in a slanting manner, meet-

ing each other half way across, so that the milk trickles from one channel into the other till it is received into a calabash placed beneath the lowest gash to receive it. Tapping the trees is often done in a very careless manner, and the trees much injured in the process.

The yield of the tree varies considerably, according to circumstances. Sometimes three pints of milk only are obtained in the course of a day, while at other times, and by a practiced hand, as much as five gallons can be procured.

To dry the milk it is poured into shallow wooden trays and exposed to as much air as possible, as well as to the sun's influence. It is, however, a slow and tedious operation. Mr. Jenman remarks that some quicker system of evaporation than that at present practiced is very desirable.

With trees of so valuable a character as that yielding balata it is most important that very great care should be taken of them, and means adopted rather to increase than diminish their numbers. The ruthless felling of trees is, therefore, to be condemned, as well as the careless tapping from which the tree receives mortal injury. Mr. Jenman justly says: "The forests should be so worked that the fullest measure of present benefit could be taken from them without impairing in any degree their future value." The report concludes with some considerations or suggestions on the better conservation of the forests, some of the remarks on which might be almost equally applied to trees other than those furnishing balata.—*Phar. Jour. and Trans.*, Sept. 5, 1885, p. 212, from *Gardeners' Chronicle*, Aug. 15.

NOTES ON COTTON SEED OIL.[1]

By W. Gilmour.

It is not my intention to take up the time of the Conference with any apology for bringing this subject forward at the present time. An oil that has been made officinal in one of our great national pharmacopœias, and which is also being imported into, as well as manufactured in this country in very large quantity, is not without interest to every pharmacist, and I think requires no apology for its introduction.

The great source from which the cotton seed oil imported into this country is derived is, of course, America, the oil being expressed from

[1] Read before the British Pharmaceutical Conference.

the seeds of various species of *Gossypium*, and subsequently purified. The oil extracted and purified in this country is not derived to any extent (if at all) from seeds obtained from America, but from seeds obtained from other channels, and which are known in this country simply as Egyptian or African, according to the port, I presume, from which they are imported. I have here present samples of the three different kinds of seeds, or rather, I should say, of seeds obtained from the three different sources, namely, American, Egyptian and African, but I have little expectation that the species of *Gossypium* from which they are derived will be determined from them, as they exhibit no very special or distinctive characteristic. The fact, however, that the oil is not only from seeds derived from a variety of species, but also from sources geographically so different, will probably be sufficient to account for any little variation afterwards noticed in the physical or chemical properties of the samples which I have examined. The seeds yield from 12 to 20 per cent. of oil, and as first extracted it is a very dark and dirty-looking mixture, as shown in the sample on the table. This crude oil has a specific gravity from ·928 to ·930. After purifying, it takes from a bright pale yellow to a deeper golden color, and according to the United States Pharmacopœia should be "odorless with a neutral reaction, specific gravity ·920 to ·930, congealing at a temperature near to 35·6°F.," etc. I have on the table a sample of pure American oil, and also one home extracted and purified from Egyptian seed. It will be seen that while the two oils closely resemble each other in smell and taste, they differ somewhat in color, the home prepared being of a deeper yellow. Every sample which I have examined, whether home or foreign, exhibits very much the same characteristics as regards smell and taste, the smell being not altogether odorless, but like olive oil when fresh and sweet, devoid of anything distinctive or offensive, while the taste is peculiarly bland and with a nut-like sweetness.

The first point I would particularly notice is the density of the oil. The United States Pharmacopœia, as well as several text-books, all give the specific gravity of cotton seed oil as ·920 to ·930. This is correct enough if intended to embrace both purified and crude oils, but ·930 is much too high applied to the refined oil alone, and is misleading if density is to be relied upon as a test of adulteration with the lighter and more valuable oils, such as olive or almond. Out of many samples examined I have never found the specific gravity to go

below ·920 and never above ·923. The greater number of samples average from ·920 to ·921.

The next point I would notice is the "congealing" point. This, of course, is very much a matter of arrangement on the part of the refiner, but I am speaking at present of this oil as it is to be found commercially. Even with the uniformity of specific gravity just mentioned, I have found considerable variation in the freezing point, some samples beginning to thicken at a temperature of 45°F., or even above this, while others did not thicken until some degrees below 32°. The former samples, I may state, were mostly home prepared, the latter, American. I merely mention this point to show that a considerable variation may exist in the physical properties of many genuine oils at present in circulation.

Another point which I endeavored to determine was the keeping properties of this oil. I have noticed, elsewhere, the case of a sample which I had in my possession for nearly ten years, and which, although devoid of the nutty sweetness of a fresh sample, had not developed rancidity or smell to any extent. I have here two samples, one of American origin, and one home prepared, which I have had exposed to bright sunshine for nearly four months. The members will be able to judge for themselves of their keeping properties under this crucial test. They have both bleached somewhat lighter in color, but they have not developed any smell, while the taste is still sweet and nutty, and no test that I have been able to apply has detected the least acidity. Under similar conditions olive oil develops both taste and smell, and acidity also may readily be detected.

Another point which I was anxious to determine, and which is important from a pharmaceutical point of view, was the place which cotton seed oil held among the fixed oils as regards drying properties. Opinion seems to be pretty much divided upon this point, but my experiments show that those authorities who place this oil midway between a drying and a non-drying oil are about correct. Taking for example five weighed quantities of cotton I saturated them with a weighed quantity of home prepared cotton seed oil, of American oil, and of olive, almond and linseed oils, respectively, and placed them on the water-bath. Six hours' exposure to this heat having made no perceptible change on any of the samples, with the exception of the linseed, I transferred them to the sand-bath and carefully cooked them over it until the linseed sample was hard and dry. At this stage the

two samples of cotton seed were getting a little viscid and slightly sticky, showing that they were in process of drying. The olive and almond samples remained soft and free. Next applying the nitrate of mercury test, as recommended by Pontet (12 grams of mercury dissolved in 11 cc. cold nitric acid of specific gravity 1·42, and 8 grams of this solution shaken frequently with 90 grams of oil), and for purposes of comparison taking also equal quantities of olive and almond oils, I found that olive oil solidified in two and a half hours, almond oil in a little over four hours, while the one sample of cotton seed oil took eight hours, and the other nearly sixteen hours to thoroughly solidify. These experiments, I think, prove that it lies as it were intermediate between a strictly drying and a non-drying oil.

The last point which I was anxious to determine was the saponifying power of this oil. I noticed at a very early period of my experiments that it formed the Pharmacopœia liniments of lime and ammonia with some difficulty, and even where the oil was got to incorporate with the alkalies the liniment was never to any extent permanent. From their behavior in this respect I concluded that some observations on the saponifying power of cotton seed oil might be valuable. I am sorry, however, I have not had time to undertake this, and principally from the fact that an investigation of this kind promised to be interminable.

I have found no two samples exactly to agree, and, therefore, any observations on individual samples are practically useless. I have here, for example, two samples of oils which, as regards their behavior with alkalies, may be regarded as typical, the one forming an emulsion with the alkalies, but separating more or less after a time, the other utterly refusing to form an emulsion of any kind. The latter oil I know to be genuine, but whether this peculiar behavior is owing to any physical or chemical difference in the oil from causes already mentioned, or whether it is owing to some peculiarity in the process of refining I have not been able to determine. One thing, however, I have noted, namely, that if even a small quantity of a saponifying oil, such as olive, be mixed with the cotton seed oil it will convert it into a miscible oil with the alkalies.

The practical conclusion to my observations and experiments is this, that cotton seed oil from its sweetness and keeping properties is admirably adapted as a base for ointments and pomades, but is not suited for forming liniments with alkaline solutions.

The supply of cotton seed is obtained from several countries and may be said to be inexhaustible. The Southern States of North America contributing the largest quantity, which may be measured by millions of tons, a great proportion of which, owing to its bulk and distance from shipping ports, is not worth the expense of transit, is burned for fuel and given to cattle and pigs for litter. A considerable quantity is used in the manufacture of decorticated cotton cake and oil, both of which find a ready sale in this country. Very little of the seed, however, in its natural state, finds its way to our markets; but a new process of clearing the seed is being prosecuted with considerable success, and it is fully expected that in a few years a large quantity of this cleared seed will be shipped to this country. Egypt may be said to be the principal source from which this country derives its supply, the quality of which is much superior to that grown in the American States. The quantity shipped from Egyptian ports, on an average of years past, is something like 250,000 tons. Improvements in the method of irrigation are said to have increased the quantity last year by 50,000 tons, and it is reported that these works are being improved and extended this season with equal success. India and the South Sea Islands also send their quota of seed to our markets.—*Phar. Jour. and Trans.*, Sept. 19, 1885, p. 250.

REPORT ON THE ACTION OF PAPAIN.[1]

By Sidney H. C. Martin, M.D. Lond., B.Sc., M.R.C.P.,
Fellow of University College, London.

In a previous paper ("Journal of Physiology," Vol. v, No. 4) I have detailed the characters and action on coagulated albumen of the proteolytic ferment obtained from the papaw-juice (*Carica Papaya*), extending the researches of Wurtz and Bouchut and others.

Wurtz had described the ferment as a proteid, soluble in distilled water, yet precipitated by nitric acid, but differing from a native albumen (as white of egg) in not being precipitated by boiling. In the material I used in my former experiments (commercial papain) I found two proteids, a globulin and a "peptone;" and I could not come to any conclusion as to which of these bodies was the ferment, or, to speak more correctly, which was associated with it.

[1] From the Physiological Laboratory, University College. Reprinted from the "British Medical Journal," July 25, 1885.

In the present investigation I attempted to settle this point. In the first place, the body called a "peptone" in my previous paper is not a true peptone—that is, a proteid capable of fairly rapid diffusion, not precipitated by nitric nor by acetic acid and ferrocyanide of potassium; but it is one of the bodies intermediate between globulins and peptone, first described by Meissner as a peptone, and called by Kuhne *hemialbumose.* This body agrees with peptone in the following reactions: It is soluble in distilled water, and is not precipitated from this solution by boiling; it also gives a pink or red color with copper sulphate and excess of potash. It differs from peptone in being precipitated by strong mineral acids, and by acetic acid and ferrocyanide of potassium. These reactions agree with those given by Wurtz as characteristic of solutions of pure papain; this agreement, indeed, led me to think that the ferment was associated with the hemialbumose. I found this to be the case. A glycerin extract was made of commercial papain, the glycerin being filtered clear under pressure. This extract contained a proteid (hemialbumose) in quantity and a mere trace of globulin. It was as active as the powder itself. Part of this extract was diluted with water, and saturated with magnesium sulphate to precipitate the small amount of globulin, which was filtered off; the filtrate was then saturated with sodium sulphate, which precipitated the hemialbumose. This was collected on a filter, washed with a saturated solution of sodiomagnesium sulphate, and then dissolved in water. This solution of the precipitated hemialbumose was found to be very active; it was tested with coagulated egg albumen, peptones being formed in quantity. The filtrate, after saturation with sodium sulphate, contained a little hemialbumose. After dialyzing for some hours, its action was tested on egg albumen; very little, if any, digested. This experiment distinctly shows that the ferment action is associated with the hemialbumose.

The result was confirmed in another experiment, in which a similar process of saturation was performed in a watery solution of papain. The result may be tabulated as follows:

Precipitate by magnesium sulphate = globulin.	Precipitate by sodium sulphate = hemialbumose.	Filtrate containing no proteid.
No action on coagulated egg albumen at 35° to 40°C.	Forms peptones from coagulated egg albumen at 35° to 40°C.	No action on albumen at 35° to 40°C.

Whether the ferment may be separated from the hemialbumose I am, at present, unable to state. Ptyalin (Cohnheim) and pepsin (Brücke) have been separated free from proteid. Trypsin, however, has not, though Schützenberger states that probably all diastatic and proteolytic ferments may be separated from the accompanying proteids.

I have repeated the experiments on animal albumen detailed in my first paper, and can only confirm what I have there stated, namely, that papain acts like trypsin (though not so rapidly) in forming from coagulated albumen and fibrin a true peptone, an intermediate body related to globulin, and leucin and tyrosin.

I have extended my experiments to the investigation of the action of the ferment on milk, and on the proteids found in papaw juice.

Action on Milk.—Papain acts like pancreatic juice on milk, and the experiments I shall describe are almost similar to those performed by Dr. W. Roberts, of Manchester, with pancreatic extract. Papain, like pacreatic extract, first curdles the milk, and, within certain limits of temperature, the curds are more quickly formed and are larger the higher the temperature up to 62°C. (about 145°F.), at which point the curdling is practically instantaneous; for example, with 5 grains of papain, and 450 cc. of milk, and 125 cc. of water at 62°C.

The curdling is hindered by making the milk alkaline with bicarbonate of soda, by diluting it, and also, to some extent, by boiling the milk previously to the addition of an equal quantity of cold water; when, if papain be added, the curdling is not so great, nor the curds so large, as when the water is boiled and added to the milk. The curds in "papainized" milk gradually dissolve, the casein being changed into peptones, leucin and tyrosin being produced, and the liquid becoming bitter to the taste. Moreover, between the stage of casein and peptone there is a body formed, which is precipitated by boiling and by nitric acid, an intermediate body similar to the one developed during the digestion of coagulated egg albumen. Its properties were tested as follows: Seeing that it must be formed from the curds first precipitated by the ferment, these were separated in one experiment, and extracted with a 10 per cent. sodium chloride solution, and the mixture filtered. The clear filtrate gave a fine precipitate on boiling, and on adding nitric acid; and, moreover, a fairly copious one on saturation with sodium chloride. This last precipitate was collected and dissolved in water (by aid of the salt present), and gave the following reactions, in addition to those previously obtained

from the unsaturated filtrate, namely, a marked biuret reaction with copper sulphate and potash, and a cloudiness with corrosive sublimate, insoluble in excess; boiled with fresh ferric acetate and filtered, no proteid was found in the filtrate, showing the absence of peptones. Hence this body, which is soluble in saline solutions, and precipitated from these by saturation with sodium chloride, and giving a biuret reaction, is a hemialbumose.

This point being settled, experiments were done to see the degree of action of the ferment in the milk. In the following experiment, the digestion of the curds (casein and fat), obtained by precipitating 200 cc. of milk diluted with glacial acetic acid, was compared with that of the same quantity of milk. The curd was well washed, to free from acid, and squeezed as dry as possible before weighing.

A.

Milk	200 cc.
Sodic carbonate	·5 gram (7½ grains).
Water	200 cc.
Papain	·3 gram (5 grains).

The water and sodic carbonate were boiled and added to the milk (which was at 10°C.); resulting temperature, 50°C. The papain was then stirred in the beaker, wrapped up, and kept in a warm place. In ten minutes the mixture began to curdle, the curds gradually dissolving; in forty-five minutes, a slight bitter taste was developed; in fifty minutes, the temperature of the liquid was 35°C. It was then boiled, causing a slight precipitate. The filtered liquids gave the tests for peptones.

B.

Curd prepared as above from 200 cc. of milk; weight	21·5 grams.
Water	200 cc.
Sodic carbonate	·5 gram (7½ grains).
Papain	·5 gram (7½ grains).

Half the water was boiled and added to the other half, containing the curd and sodic carbonate; resulting temperature 48°C. It was placed in a warm place under cover for sixty-five minutes, when the residue of curd weighed only 2·7 grams; therefore (21·5—2·7)=18·8 grams digested. The residue was chiefly fat; it dissolved almost completely in ether. The filtrate after digestion gave a slight precipitate with acetic acid in the cold, soluble in excess; none on boiling; a marked biuretic reaction with copper sulphate and potash.

It will be noticed that A was partly digested, giving a precipitate on boiling; B almost completely so, since there was no precipitate on boiling. The precipitate by acetic acid, soluble in excess, was hemialbumose. Both A and B were slightly bitter after digestion.

The point naturally suggested by these experiments was that papain might be utilized in preparing an artificial peptonized milk, its slower action being in some respects an advantage over pancreatic extract, in that the digestion can be arrested at any intermediate stage more readily. In some conditions of disease, it seems to me a distinct advantage to employ a partly digested food, because some work is left for the stomach to accomplish; in others, perhaps, a fully peptonized food would be more useful.

By a partly digested milk is meant one in which much of the casein is in an intermediate stage, namely, as "metacasein" and hemialbumose; by a fully digested milk, one where all of the casein has been changed into peptone. A and B, in the experiments quoted above, are types of the two stages.

Milk which has undergone only partial digestion is not very bitter, but has the disadvantage that it causes a precipitate on boiling afterwards. The latter result may be obviated by making it sufficiently alkaline, that is, adding 30 or 40 grains of bicarbonate of soda to the pint of milk. It is only slightly different in appearance from ordinary milk. The wholly digested milk is more bitter.

The following practical suggestions may be made regarding the preparation of papainized milk:

A pint of milk is taken, and a quarter of a pint of water; add an equal volume of milk to the water, and 30 grains of bicarbonate of soda, and boil; add the remaining milk to the hot liquid. The resulting temperature varies from 45° to 55°C.; it is usually about 48°C. (118°F.); the variation depends, of course, on the temperature of the cold milk. The papain must now be quickly stirred in, and the mixture covered with a cosey, and placed in a warm place. After digestion it is boiled to stop the action. This method does as well for pancreatic as for papain digestion; it obviates the use of a thermometer, and so can readily be done in the ward or sick room.

For preparing a partly digested milk, 7 grains of papain, with an hour and a half's digestion, is quite sufficient, using a pint of milk in the manner above described; for the more complete digestion, 10 grains for two hours must be used.

The food is greedily taken by kittens, but I have not yet tried it on patients.

Action of Papain on the Proteids in Papaw Juice.—(Only a brief summary of the results obtained can now be given; full details of the experiments will soon be published.) Of late years the former ideas of the nature and constitution of vegetable proteids have been entirely revolutionized, chiefly by the researches of Denis ("Mémoire sur le Sang"), Weyl, Hoppe-Seyler, Vines, and others; so that now we may state that the two chief proteids found in plants are globulins and "peptones." Vines considers that there is no true peptone in the seeds of plants; he thinks it is a hemialbumose, and explains away Ritthausen's "legumin" and "conglutin," obtained from the seeds of *Leguminosæ*, referring the former to the class of hemialbumoses, and the latter to a changed form of proteid produced by the action of alkalies on globulin. ("Proc. Roy. Soc.," vol. xxviii, 1878.) By pursuing the method first instituted by Denis, namely, extracting the material with 10 to 15 per cent. solution of sodium chloride, and precipitating the proteids by saturation with the salts, I have obtained from papaw juice proteid bodies, whose reactions agree with those of globulins and hemialbumoses, or rather albumoses, leaving the question as to whether they are anti- or hemia- forms for further consideration. The salts used in saturating were *magnesium sulphate*, which precipitated the globulins of the myoscin type and two forms of albumose; followed by *sodium sulphate*, which, by forming the double salt sodio-magnesium sulphate, precipitated the remaining proteids, which consisted of a trace of vegetable vitellin and an albumose (Kuhne, 'Ueber Albumosen,' "Zeitschr. für Biologie," Band xx, 1884).

The albumose precipitated by sodio-magnesium sulphate corresponds to Vines's hemialbumose; its exact position I must leave for the present undetermined. This albumose gives the same reactions previously detailed, as those of the body with which the ferment is so closely associated; it is the proteid in the juice most like a peptone. I found no true peptone.

The action of papain on these different constituents is peculiar, because in the many experiments I have hitherto done, I have been able to discover no true peptone as a result of digestion; the body which is formed from the globulins is the albumose found in small quantities in the salt extract, the body which corresponds to Vines's hemialbumose.

At the same time, leucin and tyrosin are formed from these proteids; they are found in the juice as well.

I must thank Messrs. Christy & Co. for their kindness in supplying me with specimens of papain, and of dried papaw juice.—*Phar. Jour. and Trans.*, Aug. 8, 1885, p. 129.

SEMEN CEDRONIS.

By C. Hartwich.

Several genera of the family Simarubeæ are distinguished by the large quantity they contain of intensely bitter substances, which, so far as is known, may be all identical with or nearly allied to the more exactly investigated quassiin. It is to the presence of these substances that is due almost exclusively the medicinal use of different parts of these plants, especially in former days, and which is still tolerably wide spread in the present time. For instance, the wood from *Picræna excelsa*, Lindl., and *Quassia amara*, L., are used, and the root bark of *Simaruba officinalis*, DC.,[1] and *S. medicinalis*, Endl. According to Fremi, the flowers also of the *Quassia amara* are in favor with the natives as a remedy against disorders of the stomach.[2] Further, Flückiger has referred to the high quassiin contents of the seeds of *Samadera indica*, Gaertn., without, however, mentioning any medicinal use of them. In Brazil the freshly pressed juice of *Simaruba versicolor*, S. Hil., is used as a remedy against skin parasites.[3] Further, in the same country the fruit of *Simaba Waldivia* enjoys a great reputation on account of its healing action.

To this latter genus belongs also the *Simaba Cedron*, Planch.,[4] yielding the seeds that are the subject of the present note, which have long been known and formerly enjoyed an unmerited reputation, but afterwards fell almost into oblivion. These seeds have again recently frequently appeared in commerce as a remedy in stomachic disorders. Their reputation in former times was due to the beneficial action attributed to them in fevers and snake-bites. In the latter respect it is even now believed in Costa Rica that they not only have a healing

[1] The bark of this tree is used in British Guiana for tanning.

[2] "Pharmacognosie," 2d ed., p. 461.

[3] 'Jahresbericht," 1880, p. 35.

[4] In Brazil the seed of *Simaba ferruginea*, St. Hil., is called "cedron" ("Amer. Jour. Phar.," Feb., 1880).

effect when taken by a bitten person, but it is said the exhalation from people who for a time drink a liqueur prepared from the seed or the bark acquires such an odor that poisonous snakes, insects and spiders are scared by it. But it is now recognized that an antidotal action against snake-bite does not exist in the seeds, whilst their antifebrile properties appear also very problematic. Du Coignard observed that the Indians of New Granada used 95 grams of the seed with effect during the cold shiverings, and he himself obtained results with them where quinine had failed, but he confesses that the activity of the seeds was not uniform. Other observers could recognize no action at all. Whether, as has recently been affirmed, the drug is a remedy against insanity, is probably also open to doubt.

The plant occurs in New Granada, especially along the Magdalena river. Polakowsky brought the seeds from Costa Rica, where the plant, according to his statement, grows in the hot lowlands of the coast district on the western side of the republic. He mentions also the statements of Scherzer and Wagner that it is frequent in the woods on the eastern side. It appears, however, to extend considerably further north, since seeds were exhibited in Berlin, in 1883, from Mexico.

The seeds have long been known; according to Lindley they were mentioned as far back as 1699. The tree was discovered in 1846, by Purdie, and described by Planchon. It attains a height of 6 metres, and the stem a diameter of 15 to 25 centimetres. The pinnate leaves are smooth, at least 60 centimetres long, consisting of at least twenty leaflets, and are alternate or opposite; the leaflets are sessile, 10 to 15 centimetres long, acuminate and penninerved. The common petiole is cylindrical, and terminated by an odd leaflet. The racemes are 60 centimetres long or more, densely crowded, strongly branched, covered with a short velvety reddish down. The calyx is small, cup-shaped, with five obtuse teeth, and an ochreous down. The corolla has six [according to Planchon five] spreading, pale brown petals, downy externally. Ten short stamens stand behind a similar number of scales, which approximate to form a tube. Carpels five; styles five, above the base, and longer than the stamens; one ovule in each carpel. The fruit is very large, one-seeded by reason of the abortion of the other carpels, berry-like, ovate, oblique at the top; the fleshy part of the fruit, which does not appear to be very soft, is enclosed in a horny endocarp. Seeds very large, suspended, covered with a membranous integument, with a very

distinct chalaza; no endosperm; cotyledons very large, in the fresh condition fleshy and white.

Only the cotyledons are met with in commerce. They are 3 to 4 centimetres long, 1·5 to 2·5 centimetres broad, longish ovate, rounded on one side; on the other side, straight or even somewhat reniform indented, ridged on the outer surface, smooth on the inner. At one end the cotyledons are notched in a peculiar manner, a fissure that begins nearly at the top of the ridged side running right and left for about 1½ centimetres and separating two semicircular pieces of about 2 millimetres in diameter. To this notch corresponds a point on the inner flat side of the cotyledon, which, according to Vogl, is the residue of the radicle. In a transverse section are seen upon the convex side five or six faint vascular bundles; the remainder of the tissue consists of uniform polyhedric cells, which appear to be pressed together and elongated tangentially. The contents consist of tolerably large roundish oval starch granules. In addition albumen can be detected, especially in a layer lying next the cell wall, and traces of fat. —*Phar. Jour. and Trans.*, Aug. 8, 1885, p. 127, from the *Archiv der Pharmacie*, cciii, 249.

ADONIS VERNALIS AND ADONIDIN.[1]

By Jehan Mordagne.

The *Adonis vernalis*, nearly unknown in modern therapeutics until recent years, has been rescued from oblivion by the clinical and physiological experiments of Bubnoff, in 1880, and the researches of Cervello, in 1882, upon the active principle of the plant and its physiological action. As a result, the plant has been utilized as a substitute for digitalis in the treatment of affections of the heart.

Taking up the researches of M. Linderos, who had detected the presence of aconitic acid in the plant in the state of aconitate of lime and of potash, and those of Dr. Cervello, who discovered in it a new glucoside that he named "adonidin," the author of the present paper has occupied himself principally with the latter body.

The parts of the plant operated upon were the leaves and stalks, and the process is described as follows. The leaves and stalks, after

[1] Abstract of a paper published in the "Bulletin de la Société de Pharmacie du Sud-Ouest" for July.

being exposed to the air and dried in a stove at 40°C. for several days, lose one-fifth of their weight of water. They are next macerated during five days, with about five times their weight of 50° alcohol; the liquor is then decanted off, and the spirit removed by distillation. The residual liquid is now treated with subacetate of lead, which causes the formation of a rather voluminous yellowish precipitate that carries down with it a certain quantity of coloring matter and aconitic acid as aconitate of lead. This is removed by filtration, and the filtrate treated with solution of carbonate of soda to remove excess of lead. The resulting brown solution is rendered alkaline with a few drops of ammonia solution, and then the glucoside is precipitated from it by means of a strong solution of tannin. This precipitation is not effected, or only incompletely, in an acid liquor. The tannate of adonidin so obtained is fairly abundant, yellowish grey in color, and soluble in a large quantity of water; its bitterness is characteristic. The tannate is dried between two papers and mixed intimately with very pure finely pulverized hydrate of zinc or hydrate of lead, so as to form a homogeneous powder. This is suspended in 90° alcohol, which is gently heated during several hours in an apparatus fitted with a return condenser. Or the tannate and the hydrate of zinc may be treated together with the alcohol in a capsule until the disappearance of the liquid; but the former plan has given the author the best results, the spirit being driven off afterwards in a water-bath. The residue is then treated with absolute alcohol and the mixture filtered. The resulting alcoholic solution of adonidin is treated with charcoal, so as to remove as much as possible the brown color, and then ether is added, which causes the precipitation of some foreign matters, as well as traces of adonidin. Finally, it is cautiously evaporated and the residue, spread out in thin layers, is exposed in a vacuum together with chloride of calcium or sulphuric acid.

The preparation of the glucoside is long and delicate, in consequence of the readiness with which bodies of this class undergo decomposition. The points insisted upon by the author are: (1) preliminary and thorough treatment with subacetate of lead, which removes a great part of the coloring matter, as well as a pitchy product, probably resulting from the resinification of an essential oil observed in the leaves; (2) elimination of excess of lead by carbonate of soda; (3) precipitation of the tannate from an ammoniacal solution; (4) intimate mixture of the tannate with the oxide of zinc; and (5) the avoid-

ance of too high a temperature in operating upon the alcoholic solution of adonidin, which would give rise to a deeper brown color.

Chemical and Physical Characters of Adonidin.—Adonidin generally occurs in the amorphous state, but after a long desiccation the author has obtained a substance presenting a diffuse and radiating crystallization. Ammonia vapor is sufficient to put a stop to this crystallization. The adonidin, spread in a thin layer on a plate, requires to be kept under an exhausted bell glass in the presence of sulphuric acid for at least a month in order to obtain a product relatively dry and it then forms a rather hygroscopic canary-yellow powder.

The taste of this glucoside is very freely bitter, and it is difficult to remove from the mouth the decided bitterness it provokes.

Adonidin is rather soluble in water, though it requires a short time to undergo a complete solution. Alcohol and amylic alcohol also dissolve it in the cold. On the other hand, it is insoluble in anhydrous ether, chloroform, oil of turpentine, and benzin. It retains sufficient water to render it necessary, before using it for an elementary analysis, to dry it at a temperature below 100°C.

The quantity of adonidin contained in the *Adonis vernalis* is small, ten kilograms scarcely yielding two grams of dry substance. The glucoside exists even in the rhizomes and rootlets of the plant, but insufficiency of material has prevented the author from determining in what proportion.

Adonidin, when heated in a current of dry air in an oil-bath at a temperature between 80° and 85°C. until the weight was constant, lost 3·14 per cent. of its weight of water, but underwent no perceptible change in its physical properties. Between 85° and 90° it became browner in color, and at 100°, nearly black. Upon ignition it gave off a vapor with a very penetrating and persistent odor, comparable to that of cut hay.

Adonidin is a neutral body, solutions having no other action upon litmus paper than imparting to it a yellowish tint. Under the influence of ammonia the glucoside browns somewhat intensely. A solution heated with potash is sensibly decolorized, and in the mass of the liquid may be observed the formation of yellow resinous corpuscles, insoluble in water. Baryta gives with adonidin no appreciable precipitate, and it is impossible to recognize the evolution of any ammoniacal odor. Subacetate of lead produces a certain cloudiness in solutions of the glucoside. Tannin produces in dilute solutions an abun-

dant precipitation of tannate. The ordinary alkaloidal reagents produce neither coloration nor precipitate. When a solution is heated with Fehling's solution at first only a green color results, due to the combination of the blue and yellow liquids; but if a few drops of hydrochloric acid be added, and the heating be continued, the cupropotassic liquid undergoes reduction. The product of this decomposition has not been specially studied by the author. Whatever this may be, when the adonidin is decomposed there is a precipitation of a small quantity of resinous matter, soluble in ether, whilst at the same time a very sharp and persistent odor is developed, that may be compared, as before stated, to cut hay.

When ignited on platinum foil adonidin burns without leaving a trace of residue. The author failed to detect the presence of nitrogen in the pure glucoside. Twenty centigrams heated with potassium yielded no trace of cyanide.

The imperfect crystallizability of adonidin and its readiness to undergo decomposition have hitherto prevented the author from making a satisfactory elementary analysis upon which to base a formula; but he gives the following centesimal composition as the mean of several experiments: C=42·623; H=7·547; O=49·830.

Pharmacology.—The author concludes his paper with a section on the pharmacology of the plant. As the posology is as yet incompletely worked out, this is necessarily imperfect. Taking, however, as a basis the doses of infusion administered by Bubnoff to his patients, the author gives the following formulæ for preparation:

Infusion of Adonis Vernalis.

Dried leaves and stalks	2 grams.
Distilled water	100 "

Boil the water and pour it upon the herb, and allow it to infuse for about ten minutes.

This infusion constitutes a clear chestnut-brown solution, with a yellow fluorescence. The taste is at first barely perceptible, the first sensation experienced being that of a slightly sweetened liquid; but if the contact with the palate be continued a very disagreeable and especially persistent bitter becomes perceptible.

Aqueous Extract of Adonis Vernalis.

Stalks and leaves	500 grams
Distilled water	4,000 "

Make first an infusion with the entire quantity of the drug and three litres of boiling water, and allow the whole to stand in contact for about twelve hours; then decant and pour the fourth litre of boiling water on the drug. After two hours' infusion the two liquors are united and evaporated in a vacuum over a water-bath.

An average of three operations yielded 145 grams of aqueous extract for 500 grams of substance employed. Respecting the dose, the author calculates that as the quantity of infusion given by Bubnoff in twenty-four hours represented 4 grams of stalks and leaves in 180 grams of water, and as the 500 grams of the stalks and leaves yielded 145 grams of aqueous extract, the quantity of this extract corresponding to Bubnoff's daily dose of infusion would be 1·10 gram. Of course, however, these proportions would require to be confirmed by clinical experience.

The extract has the ordinary appearance of extracts; it is black, but brown by transparence. There is nothing peculiar in the odor, and it is entirely soluble in water. Diluted with an equal quantity of water it gives an olive-brown precipitate with phosphotungstate of soda. Subacetate of lead produces a yellowish white precipitate, whilst caustic alkalies cause the color to become brighter. When dissolved in a large quantity of liquid it imparts to it a dirty yellow color. It is very bitter.

Hydroalcoholic Extract of Adonis Vernalis.

Stalks and leaves	500 grams.
Alcohol (60°)	3,000 "

Macerate the finely chopped herb during two days in the alcohol, decant the liquid, distil off the spirit and evaporate in a vacuum over a water-bath to a syrupy consistence. At this point some tarry and resinous products, which are insoluble in water, may be seen floating on the surface. The author has obtained good results by taking up the extract again with distilled water, filtering and evaporating afresh to a homogeneous mass.

The characters of this extract differ from those of the aqueous extract. It is soluble in water, and has a bitter taste and an empyreumatic odor. The aqueous solution gives with subacetate of lead an abundant precipitate, which, according to Linderos, would contain aconitate of lead. Phosphotungstate of soda produces a persistent turbidity, whilst the caustic alkalies brighten up the brown color and give it a tendency towards green. The yield of this extract is practically the same as in the case of the aqueous extract; on an average at least 250 grams may be expected from a kilogram of the plant.—*Phar. Jour. and Trans.*, Aug. 15, 1885, p. 145.

ESTIMATION OF THE ALKALOIDS IN THE LEAVES OF ATROPA BELLADONNA.[1]

By Professor Wyndham Dunstan and Francis Ransom.

In a previous communication to the Pharmaceutical Society, which formed the first part of this inquiry, we described a simple process for the estimation of the alkaloids in the root of the *Atropa Belladonna*, which consisted in extracting the root with a mixture of chloroform and alcohol, and removing the alkaloidal salts from this mixture by agitating it with water. From the aqueous solution the alkaloids are liberated by ammonia and removed by chloroform. That the alkaloidal residue obtained in this way consisted of pure alkaloid was proved by the precipitation of a certain quantity in the form of the periodides and by the recovery of the original quantity of the free bases from these salts. It was experimentally shown (1) that the root was entirely exhausted of alkaloid by the solvent; (2) that no loss of alkaloid occurred during the subsequent purification of the liquid; (3) that the final residue was wholly alkaloidal. In every similar inquiry it is necessary that these three points be individually established by experiment. The foregoing process has since been employed by other workers for the purpose of estimating the alkaloidal value of belladonna root. In continuing the investigation with the aid of a further grant from the Conference, we have sought, in the first place, to devise a reliable and convenient process whereby the alkaloids could be isolated without loss in a pure state from the leaves of the *Atropa Belladonna*. For this purpose the method which had proved so successful with the root of the plant had to be considerably modified. Great difficulties were experienced in the extraction of the whole of the alkaloid from the leaves, and in the subsequent separation of the alkaloid from the mixture of fat and chlorophyll. Without describing in detail the results of the numerous experiments which were instituted, the following conclusions may be summarized. In extracting the leaves absolute alcohol alone is to be preferred to a mixture of alcohol and chloroform. By continuous percolation with boiling absolute alcohol the leaves can be freed from every trace of alkaloid. This was proved by showing that the leaves after this treatment yielded no alkaloid either when boiled with dilute hydrochloric acid, or when mixed with

[1] Read before the British Pharmaceutical Conference.

lime and extracted with chloroform. From the extract which is obtained by evaporating the alcoholic liquid it is practically impossible to wholly extract the alkaloid by means of water or even dilute hydrochloric acid. After many successive treatments with dilute hydrochloric acid considerable quantities of alkaloid still remain associated with the chlorophyll and fat, and even after several days' digestion, a solution of iodine in potassium iodide indicated the presence of more than traces of alkaloid. We have found that by far the best method of separating the whole of the atropine and hyoscyamine from the alcoholic liquid is to dilute it considerably with water acidulated with hydrochloric acid, and then to remove the chlorophyll and fat by repeatedly agitating it with chloroform. In this way an acid solution of the alkaloids is prepared, from which the free bases may be readily obtained pure by adding excess of ammonia and extracting the alkaline liquid with chloroform. It may here be observed that chloroform is by far the best solvent for extracting atropine and hyoscyamine from an alkaline liquid. Ether, quite apart from manipulative difficulty, is required in much larger quantity to effect the same result. It now remained to prove that the alkaloidal residue which was obtained by evaporating the chloroform was pure. This was done by the method that we have described in a previous paper. The residue is dissolved in dilute hydrochloric acid and then precipitated with a solution of iodine in potassium iodide. The periodides of the alkaloids obtained in this way are decomposed by sodium thiosulphate, and after ammonia has been added the alkaloids recovered from the liquid by means of chloroform. If the residue was pure the weight of the alkaloids obtained in this way should coincide, within the limits of experimental error, with the original weight of the residue. As examples, the following out of many results may be cited:

Residue taken.		Pure alkaloid found.
0·011 gram.	.....	0·010 gram.
0·0105 "	.....	0·010 "
0·0115 "	.....	0·011 "

On the foregoing experiments is based the following process for the estimation of the atropine and hyoscyamine in the leaves of *Atropa Belladonna*, a process which fulfils the three fundamental conditions that have been previously pointed out. Twenty grams of the dried and finely powdered leaves are well packed in an extraction apparatus and exhausted with about 100 cc. of absolute alcohol. The alcoholic

liquid is diluted with about an equal volume of water made slightly acid with hydrochloric acid. The chlorophyll, fat, etc., are then removed from the slightly warmed liquid by repeatedly extracting it with chloroform until nothing further is removed by the solvent. The aqueous liquid is made alkaline with ammonia and the alkaloids extracted by chloroform, by evaporating which a residue of pure alkaloid is obtained, and dried by heating it at 100° until a constant weight is attained. We have not yet been able to make an extensive series of estimations of the amount of alkaloid which is contained in various specimens of belladonna leaves. A specimen of dried foreign leaves contained 0·22 per cent. of total alkaloid, and a specimen of English leaves which had been somewhat overheated in drying contained 0·15 per cent. We have reason to believe that both these specimens contain less alkaloid than English leaves which have been carefully grown and gathered. To these and other questions we may return at a future time.—*Phar. Jour. and Trans.*, Sept. 12, 1885, p. 237.

THE ALCOHOLIC EXTRACT OF THE LEAVES OF ATROPA BELLADONNA.

By Professor Wyndham Dunstan and Francis Ransom.

This extract, as far as we know, has not, up to the present time, received a chemical examination, and no attempt has hitherto been made to determine its alkaloidal value. In order to extract the alkaloids in a pure state from this highly heterogeneous mixture a great number of different methods have been tried, and the investigation has occupied a considerable amount of time. The extract was first dissolved in various liquids, and purification was then attempted. Among the liquids which were experimented with were chloroform, alcohol, ether, solutions of potassium and sodium hydroxide, and carbonate and dilute acids.

The difficulties which were encountered in attempting to isolate the alkaloids in a pure state were so great, owing to the large amount of fatty matter, chlorophyll, etc., which is present in the extract, that at one time it seemed impossible to effect this by any but a complicated process. However, by modifying the method which we have used for the estimation of the alkaloid in the leaves a reliable and simple process has been found. This consists in warming 1–2 grams of the extract

with dilute hydrochloric acid until as much as possible is dissolved. The mixture is filtered, preferably through glass or cotton wool, and the residue washed with hot dilute hydrochloric acid until nothing further is dissolved. The acid liquid is then repeatedly agitated with chloroform so long as anything is removed by this solvent. The acid liquid is made alkaline with ammonia and extracted with chloroform, which when evaporated and dried at 100°C., leaves a residue of pure alkaloid. This was proved by the method of precipitating with iodine, which we have previously described. The following are some of the results that were obtained:

Residue taken.	Pure alkaloid found.
0·029 gram.	0·028 gram.
0·018 "	0·017 "
0·011 "	0·010 "
0·006 "	0·005 "

The foregoing process, then, is a simple and satisfactory one for estimating the atropine and hyoscyamine in the green alcoholic extract of belladonna. It now remains to be shown with the aid of this process how far the extract as met with in commerce possesses a uniform alkaloidal strength. The analysis of a carefully prepared specimen showed the presence of 1·8 per cent. of atropine and hyoscyamine.—*Phar. Jour. and Trans.*, Sept. 12, 1885, p. 238.

THE APPOINTMENT OF AN EXAMINER OF DRUGS FOR THE PORT OF PHILADELPHIA.

The law of the United States requires that there shall be appointed a "special examiner" of drugs and medicinal chemicals at the port of Philadelphia. At New York this duty is performed under the law by an assistant appraiser.

The office of examiner being vacant in Philadelphia, by reason of the resignation of Dr. Lamb, the former incumbent, the appraiser of the port, Mr. J. B. Baker, requested the following gentlemen to examine and report upon the qualifications of the applicants for the position, viz., Charles Bullock, Robert England, A. W. Miller, M.D., and J. R. Angney, M.D.

As this appears to be the first time when applicants for this important position have not been chosen arbitrarily, a brief record of the course pursued may be of interest, and also furnish assistance for future occasions of a like character. Two of the above mentioned are retail pharmacists, and two are importers of drugs and chemicals.

The following general features were adopted:

1. The applicants to be known to the examiners by a number, and not by name; all to be examined simultaneously.

2. The examination to be in writing; the same questions to be submitted to each.

3. Specimens of imported drugs, of various qualities, to be submitted for recognition, and detection of adulterations.

4. The questions to be confined to materia medica and pharmaceutical chemistry, so far as was necessary to test the quality and purity of drugs and officinal preparations which are imported into this port.

It was deemed best to adhere to this outline, the original purpose of the office of drug inspector being to prevent the importation of damaged, adulterated, sophisticated, or worthless drugs and medicinal chemicals.

Although the drug examiner has been frequently employed as an appraiser in classification of products for duty, the committee did not deem it within their province to take cognizance of his duties in this position, but to regard him in his place as defined by the law creating the office.

The questions were so arranged that a numerical value, varying from 2 to 4, according to its importance, was attached to each subdivision. A correct determination of each specimen was marked 1. The relative numerical proportion to the questions and specimens was accordingly 85 to 15. In valuing the answers, the first three were examined and rated by one member, the next three by another member, the remaining four by a third member, and the determination of the specimens by the remaining member of the committee. Officinal names were not required, nor were errors in spelling taken into account. The plan gave uniformity in opportunity to the applicants, and equity in judgment upon their answers.

The examination was held at the U. S. Appraiser's Stores, Second and Gold streets, Saturday, October 12, at 10 A.M.

Two hours and a half were allowed for answers to the questions, and fifteen minutes for examination of the specimens. The committee determined upon an average of AT LEAST 50 per cent. as in *their* opinion necessary for making an applicant suitable for the position; at the same time they agreed to report the averages of all the applicants examined, without recommendation of any. Nine applicants were selected by the appraiser. One retired on account of sickness. The result of the examination was as follows, the averages being given in the numerical order of the applicants:

Applicant No. 1 made an average of 51·25; No. 2, 54; No. 3, 35; No. 4, 44·75; No. 5, 42; No. 6, 55·5; No. 7, 60·5; No. 8, 41·5.

The questions and a list of the specimens are annexed:

Answers from any recognized authority will be received to these questions, though they are based on the authority of the U. S. Pharmacopœia.

No. 1. OPIUM.—1. In what countries is opium largely produced? 2. What variety is chiefly imported into the United States? 3. What percentage of morphine should opium in its moist condition contain? 4. Give a process for the assay of opium. 5. Name a test for the purity of morphine.

No. 2. CINCHONA.—1. What countries produce the barks of commerce? 2. What varieties are officinal in the U. S. Pharmacopœia? 3. What alkaloids are contained in the bark? 4. What is the minimum percentage of

alkaloids which the bark should contain? 5. Give a short process for the assay of the bark. 6. What other bark is used for the manufacture of quinia?

No. 3. JALAPA.—1. Describe the drug. 2. Give its source. 3. By what means can a good article be determined?

No. 4. ALOE.—1. What varieties are found in the market? 2. How can an adulteration with resin be detected?

No. 5. ERGOTA.—1. Describe the characteristics of good ergot.

No. 6. ASAFŒTIDA.—1. Whence is it obtained? 2. Name its chief constituent. 3. Describe its physical properties. 4. What are its chief adulterations? 5. What percentage should be soluble in alcohol?

No. 7. SCAMMONIUM.—1. Give a description of the drug. 2. On what constituent does its medical property depend? 3. Give a test for the purity of this constituent. 4. What are its most common adulterations?

No. 8. ACIDUM CITRICUM.—1. What is the source of commercial supply? 2. Describe its physical properties. 3. What impurities is it likely to contain? 4. Give the tests for its purity.

No. 9. CREAM OF TARTAR.—1. How is cream of tartar obtained? 2. What acid does it contain? 3. What are the usual impurities? 4. Give tests for its purity. 5. What is its officinal title?

No. 10. SULPHUR.—1. Whence is it chiefly obtained? 2. In what three forms is sulphur officinal? 3. What adulteration is precipitated sulphur likely to contain? 4. How may that adulteration be detected?

SPECIMENS.—Give the name of each specimen submitted, and state any adulteration you may recognize.

No. 1. Colombo root, mixed with bryonia.
No. 2. Cream of tartar, in crystals.
No. 3. Senna, Tinnevelly.
No. 4. Senna, Mecca, with stems and pods.
No. 5. Senna, East India.
No. 6. Uva ursi.
No. 7. Buchu, short leaf.
No. 8. Buchu, long leaf.
No. 9. Borax, in crystals.
No. 10. Carbonate of soda (sal soda).
No. 11. Aconite root, mixed with black snake root.
No. 12. Arnica flowers.
No. 13. Pimenta.
No. 14. Cubebs.
No. 15. Black pepper.

VARIETIES.

ACID TRICHLORACETIC, A NEW ANTISEPTIC.—*Trichloracetic acid* (CCl_3CO_2H), according to Dr. Filippowitch, is a powerful antiseptic even in 0·2 per cent. solutions, while in 1 per cent. or 2 per cent. solutions it destroys all forms of organic life; in 5 per cent. it does not arrest the growth of yeast, but does that of bacteria and micrococci. In comparing its antiseptic power with that of other well-known agents, the author obtained the following scale of decreasing intensity; Corrosive sublimate, carbolic acid, trichloracetic acid, chloride of zinc, borax, and permanganate of potassium. Trichloracetic acid is a crystalline body, readily soluble in water and alcohol, and of an agreeable odor. It coagulates albumen, and its

concentrated solutions are caustic. Diluted solutions produce a hypersecretion of saliva, and destroy entirely the power of the saliva of converting starch into sugar and arrest the digestive action of pepsin; in concentrated solutions it precipitates pepsin and peptones. The author has employed this substance as an antiseptic remedy in various affections. Putrid and indolent wounds under the application of dressings soaked in weak solutions (which are entirely unirritating), are soon covered with healthy granulations and rapidly heal. It is also an excellent remedy in erysipelas and in the treatment of the fissures of the skin which often occur in œdematous parts, while in the treatment of venereal sores it is not inferior to iodoform. Internally, trichloracetic acid has been used by the author in cases of gastric catarrh, where its employment produced amelioration of the symptoms; in the summer complaint of children, where it produced a cure; and in carcinoma of the stomach, with subsequent diminution of vomiting. For external use this remedy may be employed in 1 or 2 per cent. solutions; internally to adults 2 to 5 grains of the acid in very dilute solution may be given three times a day, while to children ½ to 1 grain may be given four times daily. He also recommends this remedy as a preventive of cholera in doses of from 2 to 3 grains, three or four times daily.—*Gaz. Méd. de Paris; Quart. Therap. Rev.*, April, 1885.

The Combined Administration of Belladonna and Iodide of Potassium.—Aubert, ("Lyon méd.") affirms that the headache and coryza experienced after taking large doses of iodide of potassium may be entirely prevented by the judicious use of belladonna. In the case reported, eighty grains of the iodide were given daily, one grain of the extract of belladonna being administered in the evening. After a few days, the writer states, it is possible to suspend the use of the latter drug without any danger of a recurrence of the iodism.—*N. Y. Med. Jour.*

Calendulated Boric Acid is recommended by Dr. Charles H. Burnett, by insufflation for the middle ear, in cases of chronic suppuration; it is made as follows: Triturate together equal parts by weight of boric acid and tincture of calendula. Evaporate the calendula down in a water-bath, at a temperature of about 150° F., to a pasty consistence, and then mix with one-half the boric acid; evaporate to dryness, add the other half and triturate. This is mixed with twice its weight of pure boric acid, and futher triturated when it is ready for use.—*N. Car. Med. Jour.*, April, 1885.

MINUTES OF THE COLLEGE.

Philadelphia, September 28, 1885.

The Semi-Annual Meeting of the members of the Philadelphia College of Pharmacy was held in the Hall of the College, this day, at 3½ o'clock P.M., Charles Bullock presiding. Twenty members present. Minutes of previous meeting, as well as minutes of Board of Trustees for July and September, were read, and on motion adopted and approved.

Report of the delegates to the recent session of the American Pharmaceutical Association was made by the Chairman, Alonzo Robbins, as follows:

To the Philadelphia College of Pharmacy:

The undersigned, Chairman of the Delegation elected to attend the thirty-third annual meeting of the American Pharmaceutical Association, at Pittsburg, Pa., respectfully reports as follows:

The sessions were held in Lafayette Hall, and a large number of members were in attendance. Joseph Roberts, of Baltimore, Md., was elected President for the ensuing year. Providence, R. I., and the first Tuesday of September, 1886, were selected as the place and time for holding the next annual meeting.

Owing to the great number of Associations sending delegates, a timely resolution was presented and adopted, that only delegates from Colleges of Pharmacy and State Pharmaceutical Associations would in the future be recognized in the appointment of the Committee on Nominations.

The adoption by the Association of the New York and Brooklyn Formulary, and the probability of its serving as the basis for an acceptable National Formulary of unofficinal preparations, promises to relieve pharmacists from the annoyance and loss resulting from the use of a variety of formulas for the same preparation.

A large number of papers were presented in answer to queries, but owing to lack of time many of them were read only by title.

A resolution was adopted doing away with future exhibitions under the auspices of the Association. As the exhibition has unquestionably aided in attracting members to the annual meetings, and when held in a separate building in no way interfered with the work of the Association, the wisdom of its abandonment is not very apparent.

The meetings of the Association were held only in the mornings, the evenings being devoted to various social entertainments, and the afternoons to visits to a few of the numerous manufacturing establishments in the vicinity of Pittsburg. McKee's Glass Works, Armstrong's Cork Factory, the Edgar Thompson Steel Works, the Plate Glass Works, and the Works of the Pennsylvania Salt Company at Natrona, were all visited. These visits proved very interesting and instructive; in most of the establishments the operations carried on, having a direct bearing on their business, were of special value to pharmacists.

Preceding the meeting of the American Pharmaceutical Association, the National Retail Druggists Association held its annual meeting. The most important transaction of this body was the consideration of resolutions towards reorganization on the basis of delegations from the State Pharmaceutical Associations.

Respectfully submitted.

ALONZO ROBBINS, *Chairman.*

September 28, 1885.

Professor Sadtler, in compliance with a request of the Chairman, gave a highly entertaining verbal report of his observations of the Pharmaceutical Institutions of England and the Continent, gathered during his recent tour of travel. These descriptions were of the rooms of the Pharmaceutical Society of Great Britain, the "Ecole de Pharmacie" of Paris, the Pharmaceutical Institutes of Strassburg and Göttingen, and the Court Pharmacy of Munich, the latter presenting some features analogous to our free dispensaries of medicine, except that the royal personages, the Court officials and other dignitaries are included in the gratuity, and receive not only the ordinary medicines, but some luxuries in medication, without charge.

The terms of three members of the Board of Trustees expiring with this date, as also the yearly term of the Committee on Deceased Members, an election was ordered and Messrs. Gust. Pile and E. McC. Boring appointed Tellers. The names of the following gentlemen were placed in nomination:

Trustees (*for three years*).—William C. Bakes, Edward C. Jones, Wm. E. Krewson, Andrew Blair.

Committee on Deceased Members (*for one year*).—Chas. Bullock, Alfred B. Taylor, Gustavus Pile.

The Tellers announced as the result of the ballot the election of Messrs. Bakes, Jones and Krewson as Trustees, and of Messrs. Bullock, Taylor and Pile as Committee on Deceased Members.

No other business being presented, on motion, adjourned.

WILLIAM B. THOMPSON, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 20, 1885.

On motion of Mr. Andrew Blair, Mr. Robert England was called to the chair. The first business was the reading of the minutes of the last meeting, which on motion were adopted.

The Registrar exhibited an *improved label drawer*, designed to prevent the drawer being removed from the frame of the counter, and thus emptying it of its contents. Every druggist knows the loss of time and danger of having articles mislabeled in consequence of such accidents; the improvement consists in having movable slides, in which the drawer moves, but from which it cannot be detached; these in turn again are fastened to the frame of the counter; they support the drawer, even drawn out to its full extent. These drawers have been in use for more than a year by our fellow-member, Mr. C. H. Clark, Thirty-sixth and Race streets, and were made by Mr. Thos. H. Grigg, 3820 Lancaster avenue.

Prof. Trimble exhibited specimens of the *cochineal insect*, sent from Texas by Mr. Herman Schuchard, of San Antonio, a graduate of our College, class 1885; with the insects, which were of both sexes, the prickly pear plant was sent, and this contained patches of a white cotton-like substance, in which they were secreted.

Prof. Maisch exhibited some specimens of *false ginseng;* the first sample shown was obtained in 1881, and had no similarity in appearance to true ginseng; it was a rhizome of some monocotyledonous plant. The other sample seems to be the root of one of the umbelliferæ, but which he was unable to say; it is a fusiform root of the size and color of ginseng, but is not branched below.

Prof. Maisch exhibited a variety of specimens of *Spanish saffron*, upon which he based the paper published in the "American Journal of Pharmacy" for October, and explained the nature and characters of the admixtures and adulterations there described. Three specimens of absolutely pure saffron were exhibited; two of them were of Pennsylvania origin.

Mr. Wallace Procter exhibited a specimen of *cinnamon water* which was nearly two years old, and was made by the use of kaolin, instead of magnesium carbonate or precipitated phosphate of calcium; it was made from oil of cassia, and not with the oil of Ceylon cinnamon; the water prepared from the true cinnamon oil is very liable to change in appearance, and hence oil of cassia is most generally preferred.

Mr. Procter stated that he had recently made *gun cotton* by the process published by Mr. Pile in the Proceedings of the Pennsylvania Pharmaceutical Association for 1884. The peculiarity of the process is in the use of equal volumes of sulphuric acid, spec. grav. 1·835, and of nitric acid, spec. grav. 1·45, the latter of which is not easily obtained, but it is quite satisfactory in working; when the temperature has fallen to 95° or 100°F. the cotton is immersed for ten hours.

Mr. Pile stated that the strength of the nitric acid seemed quite important, as the sulphuric acid in uniting with a weak acid gave a much higher temperature, and he thought it owing to the amount of water uniting with the sulphuric acid; at a higher temperature pyroxylin is formed in a much shorter time, but more or less of the cotton is likely to be dissolved.

Prof. Runyon, of the California College of Pharmacy, was introduced to the meeting, and made a few remarks, stating that pharmaceutical meetings, besides the interest attached to the subjects brought forth, had a beneficial influence, and stimulated like meetings in other localities, and that their own meetings were often quite interesting and instructive.

There being no further business, on motion, adjourned.

THOS. S. WIEGAND, *Registrar.*

EDITORIAL DEPARTMENT.

COLLECTIONS AS A MEANS OF INSTRUCTION.—The intelligent examination of an object makes a deeper and more lasting impression on the mind than can be expected from mere descriptions, whether they be conveyed by lectures or by the reading of textbooks. In pharmacy a multitude of objects are in use, and the apprentice gradually becomes familiar with a larger or smaller number of the same in an empirical manner. The employer who takes an active interest in the welfare of his apprentice, endeavors to prepare the ground for his future usefulness, by teaching him the handling of the different implements and the various manipulations, commencing with the simplest, and gradually proceeding to the more difficult ones. In the meantime the apprentice has made the practical acquaintance of a number of chemicals, drugs and pharmaceutical preparations through his natural faculty of discrimination as regards shape, color, odor, taste, etc. But a systematic training in this direction is rarely possible while the actual demands of business tax body and mind almost incessantly during business hours; it is usually left to the opportunities afforded by a course in a pharmaceutical college.

Since pharmacy has to deal not with abstract things, but with a vast number of objects, it is evident that attentive listening to lectures and reading of suitable books will not by themselves thoroughly familiarize the student with the physical properties of these objects, nor with their inherent chemical and medical qualities. Lecture experiments and practical demonstrations supply the want in a measure, but not entirely. Practical instruction in laboratories goes a step farther; the student is lead to see and discriminate while operating with the test-tube or the percolator, and exact observations impress the mind with facts, precautions and with the

necessity for correct manipulation. Not only are full and precise conceptions attained thereby, but such continued systematic exercise must result in the growth of the natural powers of discernment and acquisition, and therefore in the culture of memory, as well as in an increase of actual knowledge in the place of mere information and memorizing. Each object handled intelligently in the manner indicated becomes then a fixed unit, and around this other information clusters, which cannot be acquired by the pharmaceutical student from actual observations, such as geographical distribution, commercial relations, medical properties, doses and the like.

For the thorough study of chemicals, drugs, and preparations so as to become familiar with their qualities, the handling and careful examination of them is indispensable. This opportunity should be supplied by the shops. But at the present time crude drugs and crystallized chemicals are not as generally, as in former years, kept on hand, but are often purchased in the crushed or powdered condition so as to be ready for immediate use. Even fluid extracts, extracts, plasters, and other galenical preparations are not infrequently procured from the manufacturer, and thus the facilities for home study, which every student should possess, are materially curtailed. The examination of specimens displayed on the lecture counter is in a measure, an offset to the disadvantage mentioned; but there, obviously, sufficient time cannot be afforded for more than a mere cursory examination. The cabinets connected with the Colleges may, to a certain extent, supply the want to those who have the leisure to examine them at convenient hours during the day; but since the specimens must be preserved in sealed vessels, the examination of the contents cannot be as thorough as would be desirable.

Societies of students organized for study and mutual assistance in their labors may accomplish much by the collection of specimens with the view of examining their characteristics, and even the individual student should procure for his studies such specimens of officinal articles in their natural condition as are not accessible in the ordinary routine of the business in which he may be engaged. Such specimens need not be bulky, provided they are characteristic, and with a little exertion they may be procured. We know many instances where such collections have been made by students, and have been used to a good purpose, and we think that if obtainable at reasonable rates, they would be procured by a goodly number. On various occasions we have endeavored to interest parties in the getting up of small cabinets for students' use; but the labor connected with it, for which a suitable recompense can scarcely be expected, seems to have operated against its accomplishment. We are, therefore, pleased to learn that in at least one line such cabinets may soon be obtained, since Messrs. Parke, Davis & Co., of Detroit, are preparing a student's collections of vegetable Materia Medica which will be sold at a reasonable price. There can be no doubt of its usefulness to students, and that it will materially aid them in their studies; and we hope that similar collections of chemicals and pharmaceuticals may soon become accessible in like manner, embracing either all of each class that have been admitted into the pharmacopœia, or excluding the commonest ones that are likely to be found in every store.